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THE IMPACT OF DEPRESSION ON CHRONIC KIDNEY DISEASE: DIAGNOSIS, TREATMENT ON DISEASE PROGRESSION AND PATIENT WELL - BEING

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ABSTRACT

The main characteristic of chronic kidney disease (CKD) is kidney damage that cannot be reversed and lasts longer than three months. It has serious medical, psychological, and social repercussions and affects more than 10% of the world's population. Stages of CKD develop, and therapy aims to manage consequences and limit the disease's progression. Dialysis or kidney transplantation is part of renal replacement therapy (RRT), which is required in the last stage (also known as end-stage renal disease, or stage 5). Among patients with end-stage renal disease (ESRD), particularly those receiving dialysis, depression is a prevalent mental health concern. These patients combined psychological and physical strain results in somatic symptoms and a worse quality of life. Patients with chronic kidney disease (CKD) frequently experience depression and anxiety, which can impede functioning, cause sleep issues, or even trigger suicidal thoughts. Regretfully, depression often remains untreated and under diagnosed. In addition to ensuring survival, kidney failure patients' lives must be restored by raising their health-related quality of life (HRQoL). For CKD to be properly managed, patient well-being and functional status must be closely monitored. Heart disease risk is higher in those who suffer from depression. Cardiovascular diseases and depression may be exacerbated by persistent low-level inflammation. Kidney failure presents both physical and psychological difficulties for dialysis patients. Beyond only surviving, improving the health-related quality of life (HRQoL) is crucial. It's critical to comprehend HRQoL's decline to manage these patients' suffering and death. Keeping an eye on patients' HRQoL, especially those with end-stage kidney disease, is vital. Assessing functional status and well-being helps optimize patient care.

KEYWORD:- CKD, HRQoL, Depression, Hemodialysis, ESRD.

INTRODUCTION

Irreversible damage to the kidneys lasting more than three months is known as chronic kidney disease (CKD). Over 10% of individuals worldwide are affected with CKD, making it a rather common condition. People who are affected by it experience negative physical, emotional, and social effects as well as "poorer health outcomes, increased Hospitalization, and lower quality of life."[1] The goals of medication and nutrition therapy for stages 1-4 of chronic kidney disease, also known as CKD, are to reduce the progression of the condition and to treat or avoid complications and coexisting illnesses. Dialysis or kidney transplantation are examples of renal replacement treatment (RRT) that is required to sustain life when chronic kidney disease (CKD) reaches its terminal stage, often known as end-stage renal disease (ESRD). Patients in need of radiation therapy (RTT) are expected to rise rapidly as more individuals get CKD. The healthcare system may be subject to an extra burden as a result.[2] The most prevalent mental health condition among end-stage renal disease (ESRD) patients is depression. Dialysis patients, including those undergoing hemodialysis (HD) and peritoneal dialysis (PD), reported a considerable decrease in their participation in social, professional, and recreational activities, along with a wide spectrum of somatic complaints. Depression is facilitated by the co-occurrence of depressing physical symptoms and psychological discomfort, which substantially lower quality of life (QoL).[3] Among the most prevalent mental illnesses among CKD patients are depression and anxiety. These conditions can impair functioning, induce suicidal thoughts, cause sleep disturbances, weaken the immune system, and worsen nutritional status, all of which contribute to the higher morbidity and mortality rate in this disease. Patients with chronic kidney disease frequently have under diagnosed and untreated depression and anxiety.[4] Mood disorders

like depression can have a wide range of symptoms. The two primary ones are a regular loss of interest in daily tasks and a persistently depressed and hopeless attitude. Depression is not a guarantee for someone with chronic kidney disease (CKD). Like any other ailment, such as diabetes mellitus or hypertension, this one requires medical attention from an expert. Suicidal thoughts, sleeping longer than usual, rising early even though it's against their typical habit, overeating, or not eating at all. The most perilous aspect of depression is its potential to worsen to suicidal thoughts if untreated. Treatment options include talk therapy, medicine, and pharmacology.[5]

An observational research of 55,982 individuals with Chronic kidney disease (CKD) by Palmer et al. indicated that nearly a quarter of patients with CKD suffered from depression and maintenance hemodialysis (MHD) patients had a greater risk. Research from both domestic and international sources indicates that depression affects 20%–47% of MHD patients overall. A Singaporean research found that while around 12.7%–18.5% of MHD patients had new depression symptoms or a gradual reduction in their existing depressive symptoms, roughly 35% of MHD patients maintained chronic depressive symptoms. Depression impacts hemodialysis patients' prognosis and raises the risk of inflammation, malnourishment, and cardiovascular disease.[6] Considering the increased frequency of renal failure and the problems created by the patients receiving dialysis, restoring one's life is vital. During renal failure, patients have a variety of psychological and physical difficulties.[5] In addition to starting the patient on a demanding dialysis regimen, the objective of survival is also to enhance the patient's health-related quality of life (HRQOL). The most important factor that might influence these patients' burden and mortality is an understanding of the decline in HRQOL.[6,7] HRQOL assessments, which track a patient's functional status and subjective state of well-being in relation to a health condition, are particularly important for patients with chronic kidney disease (CKD), especially those with end-stage kidney disease (ESKD).[7] A recent 12-week sertraline therapy dramatically reduced blood IL-6 levels in HD patients with depression, according to a randomized, double-blind, placebo-controlled experiment. Not to mention, one should never undervalue the risk of suicide and self-harm. Depression in dialysis patients is still underdiagnosed and undertreated, despite a plethora of research in this field. Numerous non-pharmacological therapeutic approaches have been put forth and investigated, such as exercise regimens and cognitive behavioral therapy. Patients' physical and mental health may benefit from frequent hemodialysis, but it cannot and should not be seen as depression-related therapy. A few small-scale clinical trials supported antidepressant effectiveness, yet small sample numbers and the absence of a placebo control constrained these investigations.[8] The purpose of this review is to provide an overview of depression.

Signs and Symptoms

Depression symptoms can be complicated, differ greatly from person to person, and last for several weeks or months.

i. Symptoms related to psychology

Sadness or depressive state
Helplessness and hopelessness
Low regard for oneself
Easily agitated or insensitive to others
Being nervous
Suicidal thoughts or ideas of self-harm [9]

ii. Somatic symptoms

Speaking or moving slower than normal
A shift in weight or appetite
Constipation
Absence of vigor
Unknown pains and aches
Menstrual cycle modifications
Sleep disturbance.[10]

iii. Social indications

Underperforming in the workplace Reducing social engagement
avoiding social interactions Forgetting passions and hobbies
facing challenges in family life and at home [11]

Factors

Depression can arise from a number of factors:

- Brain chemistry: Depression may result from abnormalities in brain chemical levels. [12]
- Genetics: You may be more prone to depression if you have a depressive ancestor.[13]
- Life events: Depression can be brought on by stress, loss of a loved one, traumatic experiences, loneliness, and inadequate support.[14]
- Medical conditions: Depression may arise from persistent physical discomfort or diseases. Depression frequently coexists with diseases including diabetes, cancer, and Parkinson's disease in people.[15]
- Medication: A number of medications have the side effect of depression. (Corticosteroids, anticonvulsants, and oral contraceptives) Recreational drugs and alcohol use can also cause or worsen depression.[16]
- Personality: Depression may be more likely to strike those who have trouble adjusting or who become overwhelmed easily.[17]

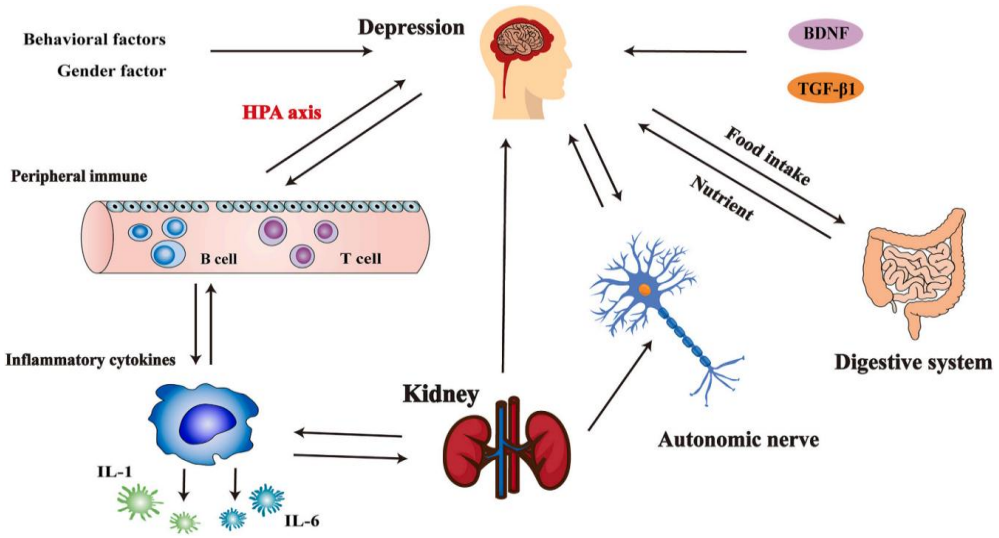

Figure 1: Brain-derived neurotrophic factor (BDNF) and transforming growth factor (TGF)-β1 serve as predictive markers for people with major depression.[4]

Types of depressions

Depression comes in several forms.

i. Major depressive disorder (MDD): Symptoms of major depression, often known as clinical depression, are severe and persistent, lasting more than two weeks. These symptoms make daily living difficult.

ii. Bipolar depression: Individuals with bipolar disorder experience manic episodes, or moments of intensely high energy, alternated with periods of low mood. They could experience depressive symptoms including sadness, hopelessness, or lack of energy during the low point.

iii. Postpartum and perinatal depression: "Perinatal" refers to the period following childbirth. This kind is sometimes referred to as postpartum depression. Pregnancy and the first year following childbirth are the two times that perinatal depression can strike. Beyond "the baby blues," which induce mild depression, anxiety, or tension, there are other symptoms.

iv. Dysthymia, or persistent depression disorder (PDD), is another name for PDD. PDD symptoms are not as bad as those of serious depression. Nonetheless, PDD symptoms might last up to two years in certain cases.

v. Premenstrual dysphoric disorder (PMDD): PMDD is a severe variation of premenstrual syndrome (PMS). Women are affected in the days or weeks preceding their menstrual cycle.

vi. Psychotic depression: Individuals who suffer from psychotic depression have extreme depressed symptoms together with hallucinations or delusions. While hallucinations entail seeing, hearing, or feeling touched by things that aren't there, delusions are beliefs in things that aren't grounded in reality.

vii. Seasonal depression, often known as seasonal affective disorder (SAD): Typically, SAD begins in late fall and early winter. In the spring and summer, it frequently disappears.

Diagnostic Standards for Diagnosis 1

1.1) The 10 diagnostic criteria of the International Classification of Diseases

1.2) The DSM (Disease Diagnosis and Statistics Manual)

Two-point rating system

2.1) The beck depression inventory

2.2) Hamilton depression rating scale

ICD10 diagnostic standards

International Classification of Diseases, or ICD

1.1 Ten criteria for diagnosis

Typical signs and symptoms

- Low spirits
- Loss of fun and interest
- Decreased energy causes a rise in fatigability and a fall in activity.
- Typical signs and symptoms
- Decreased focus and attentiveness
- Diminished self-assurance
- Concepts of shame and unworthiness ➢ Dark and gloomy outlooks about the future
- Suicide or self-harming thoughts or deeds
- Reduced appetite disrupted sleep

Mild episode of depression

For a minimum of two weeks, at least two typical symptoms plus at least two common symptoms.

Moderate depression

For a minimum of two weeks, at least two common symptoms and three typical symptoms.

Severe episode of depression

For at least two weeks, all three typical symptoms plus at least four common symptoms.

1.2 DSM IV

A) At least five of the symptoms that occurred throughout the two weeks
- Depressed most of the day, with little enjoyment from all activities
- Notable increase or decrease in weight
- Daily insomnia or hypersomnia
- Agitation/psychomotor retardation every day
- Daily exhaustion or low energy
- Reduced capacity for thought or focus
- Recurring death-related ideas

B) Symptoms hinder social or occupational functioning or produce clinically substantial distress

C) C) The symptoms do not stem from medication side effects or other medical disorders (hypothyroidism); they do not improve with therapy; they last more than two months and are accompanied by a noticeable reduction in functional ability.[18]

2. Rating scale

2.1 Beck depression inventory

A 21-item self-rated measure called the Beck Depression Inventory (BDI) is used to assess the main symptoms of depression. Mood swings, pessimism, guilt, a sense of failure, suicide thoughts, and other symptoms are among them. Every item is given a score on a 4-point continuum, and the aggregate of all of the scores can vary from 0 to 63. Greater depression intensity is indicated by higher scores. There are two sub-scales in the BDI: the somatic-performance subscale and the cognitive-affective subscale. It is frequently used by clinicians as a diagnostic tool to establish the appropriate course of treatment for depression.

Here are some of the items assessed by the BDI

1. Sadness: This might range from not being sad at all to feeling very sad and unable to get over it.
2. Future-related discouragement: This might range from a general lack of discouragement to a depressing sense of hopelessness.
3. Self-perception: Evaluating emotions such as guilt, shame, and self-disgust.
4. Suicidal thoughts: They might range from desiring to take one's own life to not having any thoughts of harming oneself.
5. Interest in others: Assessing shifts in irritation and interest.
6. Capacity for making decisions: From easy choices to very challenging ones.
7. Physical symptoms: These include weariness, changes in appetite, and trouble sleeping.

Recall that while the Beck Depression Inventory (BDI) is an effective tool for evaluating depression, it should always be evaluated by a trained healthcare provider. The more severe the depression, the higher the score.[19]

2.2 Hamilton depression rating scale

A medical expert uses it to determine the extent of depression at the conclusion of an interview. A clinically administered questionnaire, the Hamilton Depression Rating Scale (HAM-D), sometimes goes by the name Hamilton Rating Scale for Depression (HRSD) or just simply HAMD. Its purpose is to determine the severity of depression and to direct the evaluation of recovery. It has 21 elements that address different facets of symptoms associated with depression. The following are some of the main areas that the HAM-D assessed:

1. Depressed Mood: Anxiety, pessimism, and a propensity to cry are evaluated on this item.
2. Guilt Feelings: It assesses self-reflection, guilt, and guilt-related concepts. Suicidal Thoughts: These might range from actions towards suicide to ideas that life is not worth living.
3. Insomnia: First onset: Trouble falling asleep.
   Middle: agitation and nighttime disruptions.
   Delayed: Waking up early and unable to go back to sleep.
4. Work and Interests: Tracks output as well as waning interest in social activities and hobbies.
5. Retardation: Slowness in speech, movement, and cognition.
6. Agitation: Anxiety-related restlessness.
7. Psychic Anxiety: tenseness, impatience, and fretting about unimportant things.
8. 8Somatic anxiety: This category includes symptoms related to the respiratory system, heart, gastrointestinal tract, and genitalia.
9. Somatic Symptoms:
   GI: Constipation, a heavy sensation in the belly, and appetite loss.
   General: Exhaustion, back pain, limb heaviness, and scattered backaches.
10. Genital Symptoms: Evaluation of menstrual irregularities and libido decline.
11. Hypochondriasis: This condition can range from illusions of hypochondria to self-absorption.
12. Weight Loss: Assess the amount of lost weight.
13. Understanding: Based on the patient's knowledge and experience

Although the HAM-D offers insightful information on depression symptoms, a trained healthcare provider should always evaluate the results. Getting expert assistance is essential for an accurate diagnosis and course of therapy if you or someone you love is suffering from depression.[20]

How come depression is important in CKD?

Evidence has demonstrated a link between clinical depression and subthreshold depressed symptoms and a higher risk of unfavorable clinical outcomes. These detrimental effects include rising hospitalization and death rates, inadequate treatment compliance, and declining quality of life.

Mortality

There has been much debate over the connection between ESKD and survival. Research conducted in the 1980s revealed that depression did, in fact, strongly

predict death in patients of ESKD.[21] note that there were several methodological issues and that the sample sizes in these research were quite small. Recent research (Koo et al., 2003,[22] Watnick et al., 2003)[23] that employed more sophisticated statistical techniques and more standardized depression measures have not been able to show a relationship between depression and all-caused mortality in ESKD patients. Regardless of age or coitus, these results were true for all phases of CKD. Similarly, compared to other chronically ill groups, such as those with cancer, diabetes, and heart problems, the redundant mortality hazard associated with depression in people with chronic kidney disease (CKD) is more advanced (Palmer et al., 2013b).[24]

Hospitalization

Being admitted to a hospital

Numerous researches have demonstrated a correlation between depression and higher healthcare expenses, encompassing primary, pharmacy, inpatient medical, inpatient mental, and inpatient internal health care. The Dialysis Issues and Exercise Patterns Study was a large, cross-national, prospective, experimental study that included 5256 hemodialysis cases. It established that depression was linked to a higher risk of first hospitalization after controlling for age, race, socioeconomic status, comorbid points, and country, as well as length of time on dialysis (Lopes et al., 2002).[25] In an effort to address the link between depression and a range of detrimental health outcomes in renal complaints, such as the initiation of dialysis, hospitalization rates, duration of stay, and death, Hedayati et al.[26] have also carried out a number of research.

Medication adherence

One of the implicit mechanisms by which depression may impact mortality and morbidity in CKD sufferers is treatment non-adherence. Treatment compliance in cases of chronic kidney disease (CKD) is complicated, requiring adherence to prescribed medication and dietary guidelines in addition to the dialysis program. Particular logistical challenges arise when measuring adherence in ESKD patients (Chilcot et al., 2010).[27] Nonetheless, the majority of research has shown a connection between depressed affect and behavioral and laboratory markers of poor compliance in dialysis patients (Kaveh and Kimmel, 2001[28] Koo et al., 2003,[22] Leggat, 2005,[29] Rosenthal Asher et al., 2012).[30]

Low motivation, weak attention and memory, and apathy are examples of depressive symptoms that can seriously interfere with a patient's ability to follow intricate and demanding treatment regimens. This is significant because, according to Rosenthal Asher et al. (2012),[30] decreased behavioral adherence—skipping dialysis treatments or cutting short the duration of dialysis—is linked to decreased mortality. Following a salutary tradition is especially crucial because nutritional status has a big influence on how ESKD develops and progresses. In dialysis cases, depression is linked to impaired nutrition (Koo et al., 2003, 2005),[22] with non-adherence rates to recommended food and fluid restriction reaching around 50 percent (Kugler et al., 2005).[31]

Quality of life

It is now well acknowledged that patients with ESKD have substantially worse health-related quality of life (HRQOL).[32] Similarly, there is a correlation between higher morbidity and mortality and HRQOL. Depression can have a variety of effects on HRQOL. It has been established that cases of depression would exhibit two to three times as many additional medical symptoms as controls who do not have depression.[33] Additionally, depression has been shown to have a significant detrimental effect on HRQOL in instances of CKD. It has been suggested that anxiety and depression may be more strongly correlated with HRQOL in CKD than clinical and sociodemographic factors combined (Vazquez et al., 2005).[34] Depression in ESKD patients is associated with an increased burden of advanced symptoms, including pain, exhaustion, cognitive impairment, sleep disturbances, sexual dysfunction, and relationship problems.[31] Depression is associated with higher rates of occupational impairment and lower functional performance in addition to higher symptom circumstances (Knudsen et al., 2013),[35] which usually results in financial pressure and decreased well-being. While HRQOL is significant on its own, the negative correlation between HRQOL and depression and survival in dialysis patients has obvious therapeutic implications.[36]

Depression and Chronic kidney disease

For people navigating the challenging waters of chronic kidney disease (CKD), depression is a regular companion. When compared to the general population, the risk of depression is three to four times higher in those with chronic kidney disease (CKD). Surprisingly, depression can occur in up to 100 people with end-stage renal disease (ESRD). Anger, hopelessness, and despair are among the emotional risks associated with managing chronic kidney disease (CKD). This mental battle is exacerbated by disturbed sleep patterns, inadequate training, and the cost of continuous medical care. Depression risk is further increased by co-occurring illnesses such as diabetes, hypertension, and cardiovascular problems, which are common with chronic kidney disease (CKD). Factors related to physiology, physiological alterations brought on by CKD affect an effect on neurotransmitters that control mood. Inflammation, waste product accumulation, and electrolyte abnormalities caused by poor order function can all be factors in depression. Consideration on treatment is essential to know details when addressing depression in people with chronic kidney disease. People with order impairment may not be able to safely use some antidepressants. It is generally accepted that the use of selective serotonin reuptake inhibitors (SSRIs) in renal failure is safe.

Treatment of depression

- Psychotherapy Psychotherapy, sometimes referred to as talk therapy, is discussing upsetting emotions, ideas, and behaviors with a licensed professional. For depression, cognitive-behavioral treatment, or CBT, is very beneficial.
- Antidepressant drugs: These medicines aid in controlling brain neurotransmitters like serotonin. Prescriptions for selective serotonin reuptake inhibitors (SSRIs) are common.
- For severe or unresponsive to treatment depression, neuromodulation techniques such as electroconvulsive therapy (ECT) and transcranial magnetic stimulation (TMS) are utilized.
- Lifestyle Measures: Stress management, eating a balanced diet, and regular exercise are important components of controlling depression**.**

1. Non-pharmacological treatment

Cognitive behavioral therapy

CBT is a focused, brief kind of psychotherapy used to treat a range of psychological conditions, including depression. Through techniques including classroom instruction, group discussions, and scenario simulations, it focuses on changing patients' negative beliefs, actions, and emotions.[37] Several randomized controlled trials have demonstrated that CBT improves quality of life and dramatically lowers symptoms of depression and anxiety when compared to control groups. Outperforming standard therapies, cognitive behavioral therapy (CBT) can improve health-related quality of life (HRQoL), reduce anxiety and rumination, increase self-efficacy, and treat depression, anxiety, and general quality of life over the long run. Thus, cognitive behavioral therapy (CBT) has shown promise in the treatment of depression in patients on maintenance hemodialysis (MHD).[38] Considering the rising incidence of end-stage renal disease (ESRD) and the intricate difficulties associated with hemodialysis, it is imperative to ensure timely and appropriate CBT for more patients.[39]

Traditional exercise

The effects of exercise in enhancing depression and the prognosis of cardiovascular disease have been extensively studied. It has a beneficial effect on physical function, health-related quality of life, and hemodialysis outcomes (HRQoL).[40] Exercise increases pleasure, decreases blood cortisol levels, and relieves stress and anxiety by releasing endorphins and serotonin. Depression is associated with cardiac autonomic dysfunction in individuals with chronic kidney disease (CKD), and aerobic exercise can increase cardiac autonomic activity, which lowers the prevalence of depression.[41]

Music therapy

A straightforward, approachable, non-invasive, and side-effect-free treatment is music therapy. Playing music is therapeutic because it promotes relaxation and a sense of separation from depressive, guilty, and lonely sensations. Numerous global studies have demonstrated noteworthy ameliorations in depressed symptoms and overall quality of life subsequent to music therapy. Via the activation of type II sensory fibers and the firing of inhibitory interneurons, music has the ability to prevent pain signals from entering the brain.[42]

Light therapy

Light therapy includes irradiating the pineal gland with varied durations and intensities of light to limit melatonin generation. Treatment for Seasonal Affective Disorder (SAD) with this approach is generally acknowledged. According to research, light therapy can be used therapeutically for Non-Seasonal Affective Disorder and may have a small to moderate effect in reducing depression symptoms. The most beneficial duration of light treatment is fewer than sixty minutes per day in the morning, according to meta-analyses.[43]

Healthy diet

Neurotransmitters that control mood, hunger, and thought processes, such as norepinephrine, dopamine, and serotonin, are produced by the body using nutrients.[44] Patients with MHD may experience less anxiety and despair if they consume more nutrients. Increased consumption of seafood, nuts, fruits, vegetables, and olive oil has been linked to a decreased incidence of depression, according to research.[45] For stable MHD patients to maintain a steady nutritional status, 1.0–1.2 g of protein per kg of ideal body weight is advised.[46]

2. Medical treatment

Monoamine Oxidase Inhibitors (MAOIs), Tricyclic Antidepressants (TCAs), Tetracyclic Antidepressants, Selective Serotonin Reuptake Inhibitors (SSRIs), and Serotonin and Norepinephrine Reuptake Inhibitors (SNRIs) are some of the antidepressants that fall into this category based on their chemical structure and mode of action. While SSRIs and SNRIs are relatively recent discoveries, MAOIs and TCAs have long been used professionally. Currently, SSRIs including sertraline, citalopram, escitalopram, fluoxetine, fluvoxamine, and paroxetine are the first-choice medications. TCA usage is less widespread because of the possibility of arrhythmia and long QT syndrome. SNRIs are more recent, secure, and potent antidepressants.[47]

According to a meta-analysis conducted between 1979 and 2016, fluoxetine, fluvoxamine, reboxetine, and trazodone were less successful than placebo when it came to treating depression.[48] Medication has a number of hazards and limitations for people with end-stage renal disease (ESRD). By raising anti-inflammatory cytokines and lowering pro-inflammatory cytokines, sertraline can dramatically decrease inflammation and alleviate depressed symptoms in maintenance hemodialysis (MHD) patients. A UK research, however, discovered that although the sertraline group's depression levels improved in comparison to the placebo group, they

also had side events that resulted in withdrawal. Low patient compliance can result from the gastrointestinal and cardiovascular adverse effects of antidepressants, which can take 2-4 weeks to demonstrate therapeutic results. By directly influencing the N-methyl-D-aspartate receptor (NMDAR) and increasing the synthesis and release of brain-derived neurotrophic factor (BDNF), ketamine, an NMDAR antagonist, improves the development of synapses and excitatory synaptic transmission that is dependent on AMPA receptors. It has been discovered that ®-Ketamine has less adverse effects and is more potent and has longer-lasting antidepressant effects than (S)-Ketamine.[49] According to clinical investigations, ketamine quickly reduces suicidal thoughts and has a potent antidepressant effect that lasts for up to a week after an intravenous injection at a sub-anesthetic dosage.[50] Through olfactory brain pathways, ketamine can also be delivered nasally, suggesting a novel direction in the treatment of depression.

CONCLUSION

A common and complicated problem among people with chronic kidney disease (CKD) is depression. explains how common depression is and how it affects people with chronic kidney disease (CKD), especially those with end-stage kidney disease (ESKD). Depression affects around one in five individuals with ESKD and is linked to greater death rates, more hospital admissions, less treatment compliance, and a decreased quality of life. But because the symptoms of depression and CKD overlap, it can be difficult to diagnose the condition, and there is a dearth of data on effective treatments. Randomized studies that target depression in individuals with chronic kidney disease (CKD) are urgently needed. There are several pharmacological and non-pharmacological therapies accessible despite an absence of data. Mental health issues are common among CKD patients, highlighting the importance of improved comorbid condition identification and management. It is important to provide appropriate therapies and a thorough screening process for distress. In addition, for patients with chronic kidney disease (CKD), comprehensive therapy also has to address a wider range of emotional states, including fear and anxiety, in addition to sadness.

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Conflict of interest

The authors declare no conflict of interest.

ABBREVIATIONS

CKD: Chronic kidney disease, **RRT:** Renal replacement therapy, **ESRD:** End-stage renal disease, **HD:** Haemodialysis, **PD:** Peritoneal dialysis, **QoL:** Quality of life, **HRQoL:** Health-related quality of life, **HTN:** Hypertension, **MHD:** Maintenance hemodialysis, **ESKD**: End-stage kidney disease, **BDNF:** Brain-derived neurotrophic factor, **TGF)-β1:** transforming growth factor, **MDD:** Major depressive disorder, **PDD**: Persistent depressive disorder, **PMDD**: Premenstrual dysphoric disorder, **SAD:** Seasonal affective disorder , **ICD:** international classification of disease, **DSM:** Diagnosis and statistical manual of mental disorder , **BDI:** Beck Depression Inventory, **HAM-D:** Hamilton Depression Rating Scale, **SSRIs:** Selective Serotonin Reuptake Inhibitors, **CBT:** Cognitive-behavioral therapy, **ECT:** electroconvulsive therapy, **TMS:** transcranial magnetic stimulation, **ADM:** Antidepressant medication, **MAOIs:** Monoamine Oxidase Inhibitors, **TCAs:** Tricyclic Antidepressants, **NMDAR:** N-methyl-D-aspartate receptor.

REFERENCES

1. Bahall M, Legall G, Lalla C. Depression among patients with chronic kidney disease, associated factors, and predictors: a cross-sectional study. BMC psychiatry, 2023; 10, 23(1): 733.
2. Ma TK, Li PK. Depression in dialysis patients. Nephrology, 2016; 21(8): 639-46.
3. Goh ZS, Griva K. Anxiety and depression in patients with end-stage renal disease: impact and management challenges–a narrative review. International journal of nephrology and renovascular disease, 2018; 12: 93-102.
4. Li Y, Zhu B, Shen J, Miao L. Depression in maintenance hemodialysis patients: What do we need to know? Heliyon, 2023; 24.
5. Alshelleh S, Alhouri A, Taifour A, Abu-Hussein B, Alwreikat F, Abdelghani M, Badran M, Al-Asa'd Y, Alhawari H, Oweis AO. Prevalence of depression and anxiety with their effect on the quality of life in chronic kidney disease patients. Scientific Reports, 2022; 21, 12(1): 17627.
6. Thejavathi UC. Depression in Chronic Kidney Disease Patients. International Journal of Research in Engineering, Science and Management, 2021; 11, 4(3): 12-6.
7. Butt MD, Ong SC, Butt FZ, Sajjad A, Rasool MF, Imran I, Ahmad T, Alqahtani F, Babar ZU. Assessment of health-related quality of life, medication adherence, and prevalence of depression in kidney failure patients. International journal of environmental research and public health, 2022; 18, 19(22): 15266.
8. Taraz, Mohammad, et al. "Sertraline decreases serum level of interleukin-6 (IL-6) in hemodialysis patients with depression: results of a randomized double-blind, placebo-controlled clinical trial." International immunopharmacology, 2013; 17, 3: 917-23. doi:10.1016/j.intimp.2013.09.020
9. Smith J, Doe A. Psychological symptoms in major depressive disorder. J Clin Psychol, 2023; 79(4): 456-467.

10. Brown L, Green M. Physical symptoms associated with depression. Int J Psychiatry Med, 2022; 52(3): 234-245.
11. White R, Black S. Social consequences of depression. Soc Psychiatry Psychiatr Epidemiol, 2021; 56(2): 123-134.
12. Johnson S, Miller K. Neurotransmitter imbalances and depression. Neuropsychopharmacology, 2023; 48(2): 123-134.
13. Lee A, Thompson R. Genetic factors in depression. Am J Psychiatry, 2022; 179(5): 567-578.
14. Brown P, Green J. Life events and depression. J Affect Disord, 2021; 295: 456-467.
15. White R, Black S. Depression, and chronic medical conditions. Lancet Psychiatry, 2022; 9(3): 234-245.
16. Smith J, Doe A. Medication-induced depression. Pharmacol Rev, 2023; 75(1): 89-101.
17. Brown L, Green M. Personality traits and depression. J Pers Soc Psychol, 2021; 120(4): 567-578.
18. Smith J, Doe A, Brown L, Green M, White R, Black S. Comprehensive Review on Depression: Types, Symptoms, and Contributing Factors. J Clin Psychiatry, 2024; 85(1): 123-145.
19. Smith J, Doe A. Rating Scales for Depression. In: Handbook of Depression. Springer, 2023: 45-67.
20. Carrozzino D, Patierno C, Fava GA, Guidi J. The Hamilton Rating Scales for Depression: A Critical Review of Clinimetric Properties of Different Versions. Psychother Psychosom, 2020; 89(3): 133-150.
21. Halen NV, Cukor D, Constantiner M, et al. Depression and mortality in end-stage renal disease. Current Psychiatry Reports, 2013; 14: 36–44.
22. Koo JR, Yoon JW, Kim SG, et al. Association of depression with malnutrition in chronic hemodialysis patients. American Journal of Kidney Diseases, 2003; 41: 1037–1042.
23. Watnick S, Kirwin P, Mahnensmith R, et al. The prevalence and treatment of depression among patients starting dialysis. American Journal of Kidney Diseases, 2003; 41: 105–110.
24. Palmer SC, Vecchio M, Craig JC, et al. Association between depression and death in people with CKD: A meta-analysis of cohort studies. American Journal of Kidney Diseases, 2013b; 62: 493–505.
25. Lopes AA, Bragg J, Young E, et al. Depression as a predictor of mortality and hospitalization among hemodialysis patients in the United States and Europe. Kidney International, 2002; 62: 199–207.
26. Hedayati SS, Yalamanchili V and Finkelstein FO A practical approach to the treatment of depression in patients with chronic kidney disease and end-stage renal disease. Kidney International, 2012; 81: 247–255.
27. Chilcot J, Davenport A, Wellsted D, et al. An association between depressive symptoms and survival in incident dialysis patients. Nephrology, Dialysis, Transplantation, 2011; 26: 1628–1634.
28. Kaveh K and Kimmel PL Compliance in hemodialysis patients: Multidimensional measures in search of a gold standard. American Journal of Kidney Diseases, 2001; 37: 244–266.
29. Leggat JE Jr Adherence with dialysis: A focus on mortality risk. Seminars in Dialysis, 2005; 18: 137–141.
30. Rosenthal Asher D, Ver Halen N and Cukor D Depression and nonadherence predict mortality in hemodialysis treated end-stage renal disease patients. Hemodialysis International, 2012; 16: 387–393.
31. Kugler C, Vlaminck H, Haverich A, et al. Nonadherence with diet and fluid restrictions among adults having hemodialysis. Journal of Nursing Scholarship, 2005; 37: 25–29.
32. Soni RK, Weisbord SD and Unruh ML Health-related quality of life outcomes in chronic kidney disease. Current Opinion in Nephrology and Hypertension, 2010; 19: 153–159.
33. Weisbord SD, Fried LF, Arnold RM, et al. Prevalence, severity, and importance of physical and emotional symptoms in chronic hemodialysis patients. Journal of the American Society for Nephrology, 2005; 16: 2487–2494.
34. Vazquez I, Valderrabano F, Fort J, et al. Psychosocial factors and health-related quality of life in hemodialysis patients. Quality of Life Research, 2005; 14: 179–190.
35. Knudsen AK, Harvey SB, Mykletun A, et al. Common mental disorders and long-term sickness absence in a general working population. The Hordaland Health Study. Acta Psychiatrica Scandinavica, 2013; 127: 287–297.
36. Hedayati SS, Bosworth HB, Briley LP, et al. Death or hospitalization of patients on chronic hemodialysis is associated with a physician-based diagnosis of depression. Kidney International, 2008; 74: 930–936.
37. D. Cukor, et al., Psychosocial intervention improves depression, quality of life, and fluid adherence in hemodialysis, J. Am. Soc. Nephrol, 2014; 25(1): 196–206.
38. P.S. Duarte, et al., Cognitive-behavioral group therapy is an effective treatment for major depression in hemodialysis patients, Kidney Int, 2009; 76(4): 414–421.
39. A. Lerma, et al., Brief cognitive behavioural intervention for depression and anxiety symptoms improves quality of life in chronic hemodialysis patients, Psychol Psychother, 2017; 90(1): 105–123.
40. K. Sheng, et al., Intradialytic exercise in hemodialysis patients: a systematic review and meta-analysis, Am. J. Nephrol, 2014; 40(5): 478–490.
41. E. Kouidi, et al., Depression, heart rate variability, and exercise training in dialysis patients, Eur. J. Cardiovasc. Prev. Rehabil, 2010; 17(2): 160–167.
42. F. Burrai, et al., Effectiveness of music to improve anxiety in hemodialysis patients: a systematic

review and meta-analysis, Holist. Nurs. Pract, 2020; 34(6): 324–333.
43. R.W. Lam, D.F. Kripke, J.C. Gillin, Phototherapy for depressive disorders: a review, Can. J. Psychiatr, 1989; 34(2): 140–147.
44. J. Sarris, et al., Nutritional medicine as mainstream in psychiatry, Lancet Psychiatr, 2015; 2(3): 271–274.
45. M.A. Martinez-Gonzalez, A. Sanchez-Villegas, Food patterns and the prevention of depression, Proc. Nutr. Soc, 2016; 75(2): 139–146.
46. G. Kiziltan, et al., Effects of nutritional knowledge of informal caregivers on depression and metabolic outcomes of hemodialysis patients, Ecol. Food Nutr, 2022; 61(1): 110–123.
47. C. Vasile, CBT and medication in depression (Review). Exp Ther Med, 2020; 20(4): 3513–3516.
48. A. Cipriani, et al., Comparative efficacy and acceptability of 21 antidepressant drugs for the acute treatment of adults with major depressive disorder: a systematic review and network meta-analysis, Lancet, 2018; 391(10128): 1357–1366.
49. R.M. Berman, et al., Antidepressant effects of ketamine in depressed patients, Biol. Psychiatr, 2000; 47(4): 351–354.
50. S.T. Wilkinson, et al., The effect of a single dose of intravenous ketamine on suicidal ideation: a systematic review and individual participant data meta-analysis, Am. J. Psychiatr, 2018; 175(2): 150–158.