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LETTER TO EDITOR

Mental health disorders in patients with end-stage renal failure

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Abstract

Renal failure is commonly accompanied by psychological distress compounding to mental health conditions such as anxiety and depression. Common risk factors towards the development of mental health disorders in people with renal failure include the need to attend regular hemodialysis session and the burden of related complications. A growing body of evidence has elucidated the biochemical and immunological underpinnings of mental health disorders in the context of renal failure. This knowledge calls for strengthening the existing mental health support frameworks and conducting research with the reported molecular pathways as potential therapeutic targets.

Keywords

kidney failure, mental health, anxiety, depression

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Introduction

Approximately 10-15% of the global population suffers from chronic kidney disease. Its principal causes include diabetes mellitus and hypertension, two highly prevalent non – communicable diseases affecting billions of people worldwide. End-stage kidney disease, also known as kidney failure, is the fifth and final stage in the progression of chronic kidney disease. Chronic renal failure is a progressive and irreversible deterioration of renal function. Patients with this grade of kidney disease cannot survive without dialysis or a kidney transplant. The management of this condition entails regular hemodialysis sessions, dietary restrictions and recurrent hospitalizations to treat infections, electrolyte disorders and other kidney disease – related complications (Goh et.al., 2018). Patients with renal failure tend to have limited independence and functionality. This conundrum affects their quality of life and has a dire impact on their mental health (Stavropoulou et.al. 2017)

Mental health is a vital component of individual health and wellbeing. Its presence or absence reflects on everything people do, think, or say. This is particularly important for people with renal failure, the majority of whom are hospitalized with a primary or recondary diagnosis of a mental disorder. More than one fifth of these patients had two or more psychiatric diagnoses. Patients with end-stage kidney disease experience a higher rate of mental illness than the general adult population. Beyond depression, patients might experience a myriad of psychological distress symptoms including anxiety and fear of chronic kidney disease progression (concerns about hopelessness, death, and dying) (Goh et.al., 2018). They also might experience recurrent psychological and physical trauma during the

chronic kidney disease course. The most frequent mental illness in this population is anxiety (20.0%), followed by depression (16.8%), stress reaction/adjustment disorder (2.5%), somatoform/conversion disorder (0.9%), and substance abuse disorder (0.6%).Studies have shown that patients with chronic kidney failure experience a high level of emotional distress even in the early stages of disease progression, and in most of them, they have low feelings of personal control (Stavropoulou et.al. 2017).

The burden of the disease and its behavioral implications have always been considered as principal contributors to psychological distress and disorders (Stavropoulou et.al. 2017). However, emerging research shows that a host of biochemical and immunological mechanisms can also play an important role in the development and the progression of mental health conditions among patients with renal failure. These mechanisms may mediate the translation of the social and behavioral burden of the disease in psychological stress or may contribute independently to the development of mental health disorders.

Purpose

This paper provides an overview of biological mechanisms that may contribute to the development or the progression of mental health disorders among patients with end stage kidney disease.

Methodology

To identify relevant peer-reviewed publications and gray literature the authors searched PubMed-Medline and Cochrane Library-Cochrane Central Register of Controlled Trials (Central) till June 31, 2022.The reference lists of the selected sources and relevant systematic reviews were also hand - searched to identify potentially relevant resources. The search terms: Mentlal health,chronic kidney disease,renal failure,depression,COVID-19,were used in combination with Boolean operators(AND,OR) when appropriate.Studies, were included if they fulfilled all the following eligibility criteria: (1) ongoing or published clinical studies reporting on digital and remote healthcare applications in the prevention or management of mental health in endstage chronic failure and (2) study types: editorials, opinion articles, perspectives,letters to the editor. No sample size restriction was applied when screening for eligible studies.

Results and limitations

For decades it has been known that immunologic factors have potent influences on neurotrasmitter metabolism and neuroendocrine function.A growing number of studies have investigated the relatioships between cytokines and depression.Depression is the most common psychological disorder among patients with end-stage renal disease (Chen et.al.,2003; Palmer et.al.,2013). The etiology of dialysis-related depression is multifactorial and is related to biological ,psychological ,and social mechanisms.Some of the biological mechanisms include increased cytokine levels ,genetic predisposition ,and neurotrasmitters affected by uremia.During hemodialysis ,the blood dialyzer interaction has the potential to activate mononuclear and denditic cells ,leading to production of inflammatory cytokines.In particular ,there is evidence that depression is associated with interleukin (IL-1),(IL-6) (Kamimura et.al., 2007; Pereira et.al.,1994) tumor necrosis factor alpha (TNF-a) and C-reactive protein (CRP) (Hirotsu et.al.,2011). It has been speculated that proinflammatory cytokines play a role in the pathogenesis of depression and growing evidence suggests that the mood disorder is associated with inflammation (Dantzer et.al., 2004). In several studies, it was also shown that there is a positive relation between depression and proinflammatory cytokines and C-reactive protein (CRP) (Panagiotakos et.al.,2004), and also the alterations of cytokines in hemodialysis (HD) may be related to depression. Furthermore, an additional study showed that serum proinflammatory cytokine levels in end-stage renal disease patients were 10 times higher than in the normal population (Heimburger et.al., 2000). However, the repeatability of these results is yet to be determined, with conflicting evidence being reported in some occasions. Many factors may explain these conflicting results, including variability in age, gender, nationality, and methodological differences in the measurement of cytokine concentrations.

Other researches have demonstrated frequent and close relatioships between serum albumin levels and depression. Cytokines production, particulary IL-6, might induce protein catabolism and lipolysis ,but cytokines have a strong negative correlation with serum albumin levels .However,malnutrition ,which is commonly observed in dialysis patients ,is related to chronic inflammation .It has also been reported that malnutrition is associated with emotional symptoms among hemodialysis patients.Thus,chronic inflammation and malnutrition might result in fatique by either directly activating the central nervous system throught adrenal axis or by indirectly triggering multisystem deregylation (Friedman et.al.,2010).

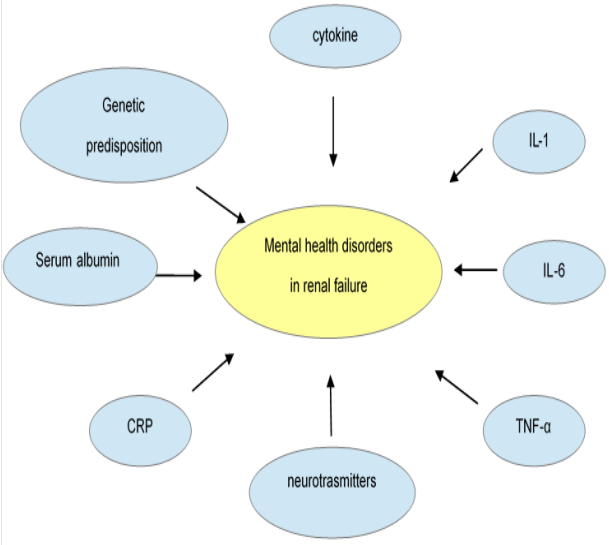

Figure 1 The biochemical and immunological underpinnings of mental health disorders in renal failure are summarized

Accordingly, reduced kidney function has been independently associated with worse microstructural integrity of brain white matter, as evaluated by diffusion tensor imaging magnetic resonance imaging. Also, albuminuria has been associated with larger white matter volume and decreased estimated GFR with higher cerebral blood flow in nondiabetic hypertensive adults. Although subclinical cerebrovascular damage in chronic kidney disease can be easily detected by MRI, this is not performed routinely in clinical practice. In addition, studies about this issue are still scarce. It is important to understand the mechanisms shared by renal impairment and brain dysfunction in order to minimize the risk for future neuropsychiatric conditions due to chronic kidney disease (Sedaghat et.al., 2015; Tamura et.al., 2016).

During the last two years, the COVID-19 pandemic has affected the lives of all people, especially people living with kidney disease. New challenges and fears surrounding the pandemic can increase the stress and anxiety (Rayan et.al., 2021). For patients that go to a dialysis center for treatment, this can increase their stress and anxiety of being exposed to COVID-19. If they have a transplant, they may have a weakened immune system and fear complications of getting infected with COVID-19.Social distancing may also increase feelings of loneliness and isolation. (Romash et.al., 2020; 2022). We don't have to forget that suicide is the most serious result of mental illness among the patients,and the percentage of suicide attemption have increased dramatically since the beginning of the COVID-19 pandemic (Reger et.al., 2020)..

Conclusions

To conclude, the prevalence of mental instability and psychiatric disorder among patients with chronic kidney disease can be as high as 100%, depending on the diagnosis criteria and the studied population. The prevalence of depression and the risk of hospitalization due to psychiatric disturbances are higher in patients with renal failure, thus the individual health professionals and national and international health bodies need to consider new ways to protect these patient from the psychological sequelae of chronic kidney disease. Some examples are the provision of psychological support by experienced mental healthcare workers (physicians, psychologists, community nurses, social workers) throughout the patients' treatment. Collaboration between individual healthcare workers and facilities and scientific and professional societies is needed in order to integrate mental health support to the standard of care and bring quality improvement to relevant practices that have been already implemented. In the long term, it is worthwhile to investigate whether elements of the reported biochemical and immunological evidence can be used as biomarkers or therapeutic targets. This can help devise personalized treatment strategies for mental health conditions developing along the progression of kidney disease.

Conflict of interest

The authors declare that they have no conflicts of interest.

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