

# Chronic Kidney Disease

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## Abstract

Throughout the 21<sup>st</sup> century, the number of people who experience chronic diseases have dramatically surged resulting in three quarters of deaths worldwide. Chronic illnesses such as Chronic Kidney Disease (CKD) are characterized by long lasting conditions that require progressive treatments, as well as a restricted lifestyle due to their several symptoms. These symptoms can vary from fatigue and pain to lethargy and mood disorders, which undeniably influence the patients' daily routine. The management of this illness may be inconvenient for patients, as it requires them to appear, for four hours, three times per week at dialysis clinics. In other terms, dialysis is a long-term commitment where patients find themselves ceasing work or other activities, in order to attend treatment sessions [1-5].

**Keywords:** • Chronic Kidney Disease (CKD) • Hematuria • Dialysis treatments

## Introduction

As attested by chronic renal disease is a continual damage of renal functions defined by the presence of blood and protein in the urine (hematuria and proteinuria, respectively). This damage is commonly caused by diabetes and high blood pressure. Concerning diabetes, high sugar level destroys kidneys' filters overtime, resulting in the presence of a specific protein in the urine called albumin. According to, this protein is extremely important for the human body, since its foremost role is to regulate the oncotic pressure of blood. Furthermore, state that its continuous loss will disrupt the equilibrium established between the oncotic pressure and the hydrostatic pressure, causing oedema to develop [1-5].

Damage may occur in blood vessels due to high blood pressure, leading to a lack of oxygen and nutrients arriving to the functional unit of the kidneys that is responsible for filtration, namely the nephrons. Thus, an incessant blood flow is necessary in order to function well. Progressively, the blood vessels surrounding the kidneys become weaker and narrower, causing the nephrons to be less efficient. As a result, extra fluid remains in the blood vessels [6-10].

## Diagnosis

Blood tests and urine tests are the first steps to be undertaken. As specified by Mayo, blood tests are important to explore the amount of waste products, namely urea and creatinine in the blood. Additionally, urinalysis allows to investigate whether there is blood or protein, such as albumin in the urine.

However, the National Kidney Foundation claims the best assessment is to measure the Glomerular Filtration Rate (GFR). Indeed, calculating the GFR is the most reliable technique to measure the kidney function and determine the stage of the disease, since it relies on inherited traits. Highlights the fact that the earlier kidney failure is recognized, the better the opportunity of halting its progression.

## Risk factors

Declares that numerous features influence the risk of having a Chronic Kidney Disease (CKD) viz; family history, age, obesity, ethnicity and smoking. Family members of CKD have a high prevalence of CKD. Kidney function declines with age in both genders. Hence, the elderly population is further susceptible to develop CDK. Obesity results in hypertrophy and hyperfiltration of glomerulus. Overtime, this condition contributes to pathogenesis of kidney damage. affirm that the incidence is greater in African Americans compared to Caucasians. Additionally, the risk of high blood pressure is five times greater among African Americans. For every five cigarettes smoked, the level of serum creatinine increases.

## Management

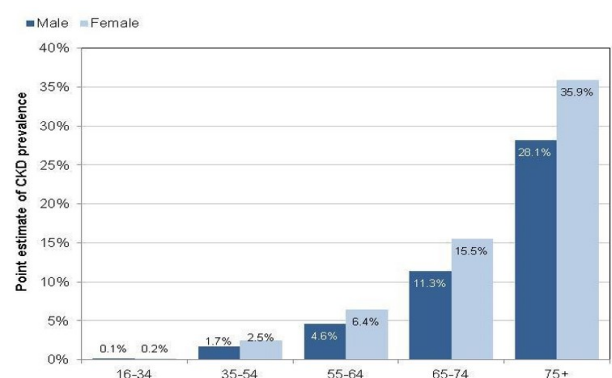
As reported by the National Institute of Health (NIH), several steps can be performed in order to reduce kidney damages. In the early stages of CKD, medications can be prescribed, aiming to prevent more damage. However, in the end-stage CKD, dialysis and kidney transplant are the solutions [11-15].

## Epidemiology

More than 1.8 million individuals in England have been diagnosed with CKD, with approximately a million people more yet to be discovered with this condition. According to Kidney, around 63,000 patients are being treated with dialysis and/or medications.

Some variations in prevalence can be noticed around the different regions of the UK. Indeed, the highest numbers were perceived in the South East and North West with 447,460 and 414,954 people diagnosed with CKD. Nonetheless, the lowest figures were noted in Yorkshire and North East with 204,268 and 132,804, respectively. Moreover, the prevalence is different in both genders. Nearly 985,422 of men have CKD, compared with more than 1,638,082 women in Britain. Furthermore, as stated by the, every day 20 people develop CKD in the UK.

### Summary of estimated CKD prevalence in England



**Figure 1:** Bar graph representing CKD prevalence according to age and gender.

As seen in Figure 1, there is a positive association between age and CDK prevalence. Among people aged 65-74, the prevalence of CDK is approximately 13.5%, whereas for those aged 75 and over the prevalence is around 32.7%. In other words, age has a positive association with the prevalence of CKD. Additionally, Figure 1 reveals there is a higher prevalence among women in all ages, compared to men.

## Materials and Methods

This report aims to identify psychological interventions that can be taken in order to reduce or to stop the progression of CKD. It also outlines several sociological settings relating to CKD.

During the search of papers, PubMed, Medline and BMJ were the main databases. The focus group was patients suffering from CKD. The first search occurred on the 1<sup>st</sup> November 2019, using the following terms: Chronic renal disease, UK [16-20].

Afterwards, in order to be more specific, several additional search terms were added to increase the relevancy of the search: 'psychological interventions', 'health behavior', 'social determinant', 'high salt intake', 'salt consumption' and 'high salt diet'. Additionally, throughout the research period, other databases were used to gather more information, namely PsycInfo and Cochrane library.

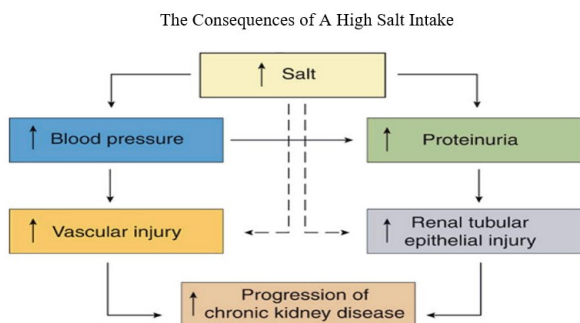
A limit of 10 years publication date was also applied to ensure the research was up to date. This was done so as to permit accuracy. The use of full text and English language filters refined the results. Furthermore, several articles were excluded because they were devoted to other complications before CKD.

## Psychology

**PICO:** Population Intervention Comparison Outcomes

- Dialysis patients
- Introducing low salt diet
- Compare patients with usual diet to those following a high-salt diet, or low-salt diet
- Attenuate the decline of kidney failure

According to, Chronic Kidney Disease (CKD) is mostly incurable and treatments generally comprise of measures to help control symptoms and complications as well as reducing the progression of the malady. As a matter of fact, CKD is accompanied with numerous co-morbidities, namely hypertension and cardiovascular disease, that may lead to fatality. An alteration in salt level nutrition is an important tool to control these co-morbidities, preventing deterioration of CK.



**Figure 2:** Showing different consequences of a high salt intake.

### Salt and blood pressure

Hypertension is a crucial factor that needs to be controlled in patients with CDK, because it damages kidneys' vessels and aggravates the evolution of the disease. Nonetheless, no firm assumption can be made since most of study's data come from small observational study.

Salt intake is not directly linked to kidney diseases. However, a low level of salt leads to a dramatic reduction of blood pressure, which is at the heart of kidney failure. It is vital to diminish sodium intake to slow the progression of CDK. Restraining

Restraining sodium aids lowering blood pressure, which places less stress on the kidneys [21-26].

Interestingly, observed, amid 738 dialysis patients, that there was a mean difference of -4.9 mmHg in systolic and -2.3 mmHg in diastolic blood pressure. These data are a meta-analysis of randomized controlled trials and, although the amount of salt consumption was evaluated over a period of 24 h, it seems reliable. Moreover, an addition of 60 mmol of salt to the normal diet of 25 peritoneal dialysis patients, upsurges the blood pressure by 9 mmHg in systolic and 5 mmHg in diastolic. This study shows a positive correlation between salt and blood pressure, relying on a persistent evaluation of blood pressure over a 24 hours period. These two studies are comparable in the sense of demonstrating a substantial association between high salt-intake and blood pressure, but the studies' periods are too short to generalize the data.

Affirmed that, among patients with a mean age of 47.6 years, a slight reduction in daily salt-intake leads to a decrease in systolic (from 134.3 ± 20.1 to 127.2 ± 19.5 mmHg) and diastolic (from 83.2 ± 12.0 to 77.4 ± 10.5 mmHg) blood pressure. Although, this paper illustrates relevant Figure 2, it solely focuses on patients in their forty's, resulting in uncertainty about all other age groups.

All the above mentioned studies demonstrated that salt intake does not directly implicate in the progression of CKD, but it decreases considerably blood pressure, resulting in beneficial effects on kidneys functions.

### Salt intake and other complications

As stated by, patients following a high salt diet showed a drastic decline in kidneys' functions as well as vascular and glomerular fibrosis. This is caused by the effect of high sodium intake on endothelium cells, resulting in the production of nitric oxide and transforming growth factor beta 1 (tgfβ1). This growth factor plays an important role in controlling the immune system and inducing adaptive immunity cells (CD4+). Therefore, patients following a low salt diet have a lower risk of inflammation, endothelial cell dysfunction and stiffness of vasculature, compared to those who follow a normal diet.

According to, over 23,000 hypertensives individuals had a solid relationship with the risk of Chronic Kidney Disease (CKD) in both genders. By using a large number of participants involved in the experiment, this study seems relevant because the larger group of patients, the more reliable the results become. In other terms, larger sample studies produce narrower confidence intervals and, therefore, more precise results. Nonetheless, patients following a high salt diet are more likely to have oedema in comparison to those who follow a low salt diet, due to water retention as shown in (Figure 3).



**Figure 3:** Diagram representing the consequences of a high salt diet on the body.

In contrast, compared the risk of death among dialysis patients and found that patients consuming less than 6 g per day have a higher risk of death due to cardiovascular diseases. Among 88,115 patients, the highest mortality rate was observed in the low salt-intake group (<6 g/day), whereas the lowest mortality rate occurred amidst patients following a high salt diet (>9 g/day).

Diet is an important factor to control among dialysis patients. As seen, the main behavioral control among those patients is salt intake. Despite the fact that it is not directly linked, it is a crucial factor to control in order to decrease or prevent the progression of the CKD.

**Sociology**

Sociologists have shown that the spread of chronic illnesses is vigorously affected by the socioeconomic state of people, their ethnicity and other social factors.

**Ethnicity**

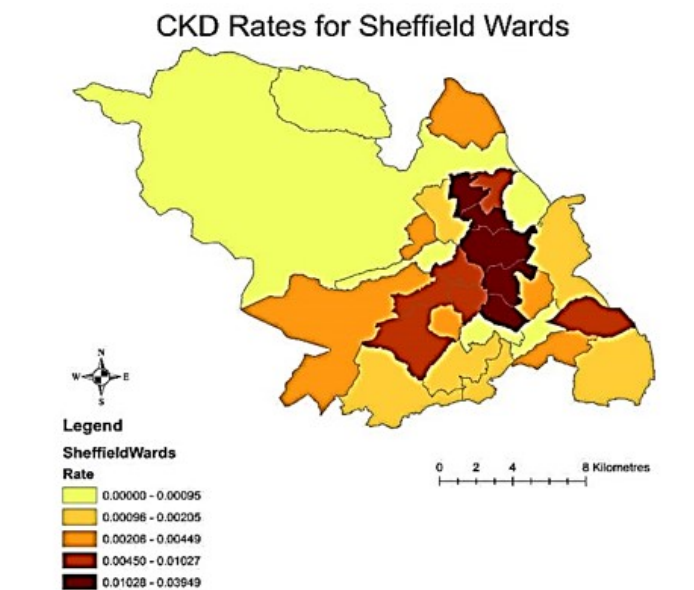
There are evident contrasts in examples of well-being and disease across different communities all around the world. Actually, African Americans have a greater risk of suffering from CKD than Caucasian populations. They are roughly more than four times more likely than Caucasians to progress to stage five CKD and even changing several behavioral aspects such as smoking, diet and controlling comorbidities will not lower this risk. Explained that this vast dissimilarity between different communities is due to the fact that minority populations such as African Americans have a greater incidence of diabetes and high blood pressure. These complications are mainly more severe in these populations and tend to increase the risk of CKD, leading to an earlier start of dialysis treatments.

Despite the fact that these populations have a higher risk of diabetes and hypertension, they also experience an early onset and a poor control of these illnesses, leading to several other complications such as stroke and CKD. This study involved more than 33,000 dialysis patients of whom 16% were Spanish, 32% Africans and the remaining were Caucasians. This high population diversity used in this study makes the information of this paper more pertinent.

Nonetheless, as stated by, the higher risk for CKD among minorities can be explained by their economic status. Although ethnicity is at the heart of developing chronic kidney disease, socioeconomic deprivations are an important factor, as well.

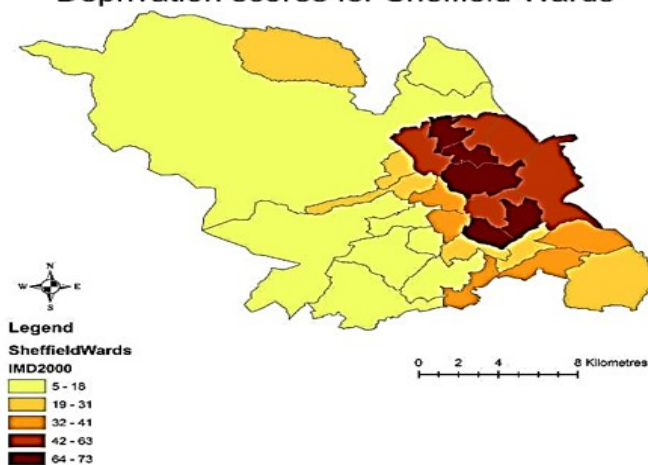
**Economic status**

In England, chronic renal disease influences socially deprived minorities, namely ethnic minorities and individuals with low financial income. Additionally, individuals with low financial status have a 59% higher risk of developing this disease. Habitation in deprived areas was seen firmly connected with an upsurge of CKD. Moreover, used a retrospective study of 1,657 patients suffering from CKD to demonstrate that diagnosis of CKD is greater in deprived regions, as well as a poor prognosis and a drastic diminution in the survival rate.



**Figure 4:** Map showing the distribution of CKD prevalence in Sheffield.

**Deprivation scores for Sheffield Wards**



**Figure 5:** Map illustrating the Index of Multiple Deprivation (IMD) for similar wards in Sheffield.

As seen in the Figures 4 and 5 above, the darker shaded areas demonstrate a greater occurrence of CKD. There is a well-defined pattern within deprived zones compared to the least deprived areas. Additionally, only a specific area of England was considered in this study, which makes it unreasonable to generalize the data. A comparison between Sheffield area and the rest of England should have been made in order to evaluate the persistency of the data.

**Discussion**

Low economic status are important factors, controlling social elements of health, namely appropriate habits, and, in some areas of UK, accessing efficient healthcare services. According to, low income may lead the patient to live in the outskirts of a city, where all the factories are. These specific zones are generally harmful due to the continual exposure of nephrotoxic particles, particularly lead and arsenic.

Nonetheless, a great number of patients suffering from CKD are obliged to terminate their employment due to the timing of dialysis sessions. Tshe UK, approximately 75% of patients were unable to conserve their stable profession and 60.2% of those were forced to change their work or retire. The disruption of employment has a dramatic negative influence on the financial status of these CKD patients, as some are unable to afford medications and transportation to dialysis centers. Unemployment may also cause other complications such as loss of self-esteem and depression. These psychological difficulties have a role in worsening the progression of the CKD, leading to a sudden interruption of treatment.

As demonstrated in study involving 313,639 patients aged over 18 with socioeconomic status and rurality projected at 39% in the prevalence of CKD, among which the most influence derived from low socioeconomic status (25%). drew a similar conclusion, implicating 5,115 patients from 30 different countries. In this study, affirmed that poverty and unemployment are crucial factors in causing interrupted care.

**Conclusion**

The important behavioral control among patients suffering from CKD is diet. It has been affirmed that a high salt diet results in high blood pressure, which is a crucial factor in the development of CKD. By lowering the salt intake, patients may witness a positive change in the progression of their CKD. Therefore, it is important for dialysis patients to follow a low salt diet.

Numerous sociological contexts may cause an aggravation of the progression of CKD, namely ethnicity and low socioeconomic status. Regarding ethnicity, Africans Americans are at a higher risk of developing CKD, compared to Caucasians. Concerning low socioeconomic status, poverty leads to a drastic deterioration of the progression of CKD. In effect, proposing low

salt diet for dialysis patients could be a way to prevent progression to stage 5 CKD, and/or death.

This SSC report emphasizes on the importance of integrating the biopsychological model in healthcare. This paper allowed me to understand the significance of chronic diseases, such as CKD. Apart from treatments, the psychological part plays a crucial role in the well-being of CKD patients, since they may feel depressed and lonely. However, I assume that by tackling these psychological aspects, the patient will feel better physically and mentally. This report will help me, in my future career, to elaborate more on psychological aspects with patients in order to understand their perspectives so that my treatments approach will be more efficient depending on each patient's unique situation.

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