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| RESEARCH ARTICLE

End Stage Kidney Disease (ESKD) and Related Chronic Diseases: Causes and Implications

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| ABSTRACT

Chronic Kidney Disease (CKD) is a major public health issue that often coexists with various chronic conditions, leading to significant morbidity and mortality. This study analyzes patient data from the hemodialysis unit of Mesallata Central Hospital, Libya, involving 57 patients meeting the ESKD criteria. The leading causes of CKD were hypertension (26.3%), diabetes mellitus (21.1%), and autosomal dominant polycystic kidney disease (19.3%). The most common comorbidities included hypertension (64.9%), ischemic heart disease (21.1%), and congestive heart failure (14%). The average duration of CKD was 13.7 years, with an average dialysis duration of 7.4 years. These findings emphasize the urgent need for integrated strategies to address the dual burden of CKD and associated chronic diseases, particularly in resource-limited settings.

| KEYWORDS

Chronic Kidney Disease, mortality, diabetes mellitus

| ARTICLE INFORMATION

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1. Introduction

Chronic Kidney Disease (CKD) is a progressive condition characterized by the gradual loss of kidney function over time. It is often a consequence of underlying chronic illnesses and contributes significantly to global disease burden. Despite advancements in medical care, the prevalence of CKD continues to rise, particularly in regions with high rates of diabetes and hypertension. This study examines the causes and comorbidities associated with CKD, utilizing data from 57 patients with end-stage kidney disease (ESKD) at Mesallata Central Hospital, Libya, to highlight patterns and implications for healthcare strategies. The findings align with previous research that underscores the multifactorial etiology of CKD [Kidney Disease, 2013; Xie, 2018].

1.1 Objectives

1. To identify the primary causes of CKD in a sample of patients with ESKD.
2. To evaluate the prevalence and impact of chronic comorbidities among CKD patients.
3. To explore the relationship between the duration of CKD and associated complications.
4. To provide recommendations for improved management and prevention strategies.

1.2 Research Gaps:

While significant research has been conducted on CKD, several gaps remain:

1. Limited understanding of regional variations in CKD causes and comorbidities.
2. Insufficient data on long-term outcomes of CKD patients with multiple comorbidities.

3. Lack of integrated care models addressing both renal and cardiovascular health.
4. Minimal focus on the impact of genetic factors like APCKD in diverse populations.

2. Literature Review:

Previous studies have established hypertension and diabetes as primary contributors to CKD [Hill, 2016]. Polycystic kidney disease, though less common, remains a significant hereditary cause of CKD [Chapman, 2015]. Cardiovascular diseases, including congestive heart failure (CHF) and ischemic heart disease (IHD), are frequently reported as comorbidities, complicating patient management and increasing mortality risk [Cockwell, 2020]. These findings underscore the need for comprehensive strategies targeting both the prevention and management of CKD and its associated conditions.

3. Study Design and Methodology

3.1 Study Design:

This study is a retrospective observational analysis of 57 patients diagnosed with CKD and ESKD. It examines patient demographics, primary causes of CKD, comorbidities, and dialysis durations to identify trends and correlations. The study was conducted in the hemodialysis unit of Mesallata Central Hospital, Libya.

3.2 Inclusion and Exclusion Criteria

- **Inclusion Criteria:**

  Patients aged 18 years and above diagnosed with CKD last stage ESKD.
  Availability of complete medical records, including demographic, clinical, and laboratory data.
  Patients undergoing dialysis for at least one month.

- **Exclusion Criteria:**

  Patients with incomplete medical records.
  Acute kidney injury without progression to chronic kidney disease.

3.3 Data Collection

Data were collected from medical records at Mesallata Central Hospital. Key variables included:

1. Demographic details (age, sex).
2. Primary causes of CKD.
3. Comorbid conditions.
4. Duration of CKD and dialysis.
5. Family history of renal disease. Descriptive and inferential statistics were used to analyze trends and associations. Data were presented as percentages and means, with chi-square tests applied to assess relationships between variables. Figures and tables were generated using statistical software to aid in data visualization.

4. Results

4.1 Demographics

- Total patients: 57
- Male: 30 (52.6%)
- Female: 27 (47.4%)
- Age range: 25 to 82 years
- Mean age: 54.8 years

Table 1: Demographic Breakdown of CKD Patients

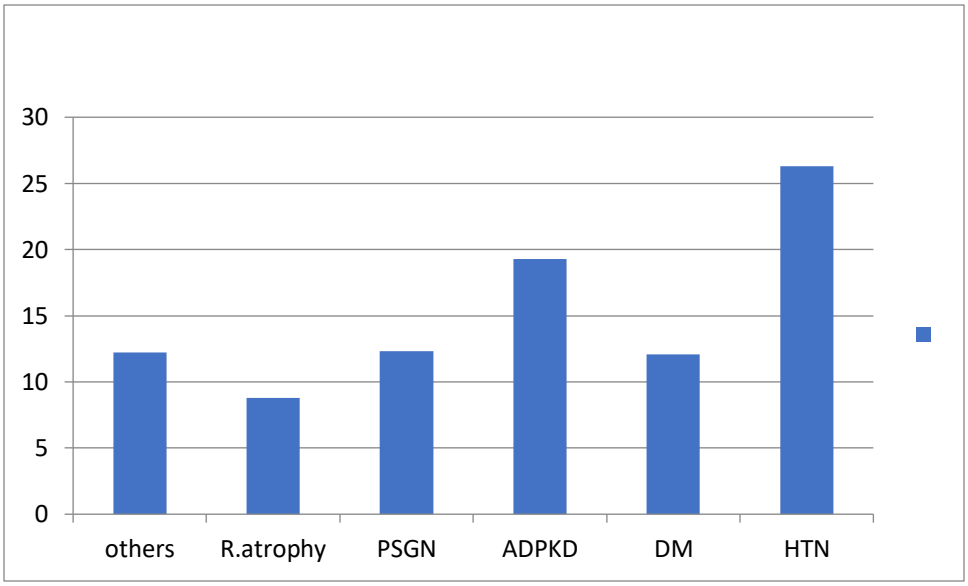
Demographic	Value
Total Patients	57
Male Patients	30 (52.6%)
Female Patients	27 (47.4%)
Mean Age (Years)	54.8

4.2 Primary Causes of CKD

The leading causes of CKD in the sample were:

- **Hypertension (HTN):** 15 patients (26.3%)
- **Diabetes Mellitus (DM):** 12 patients (21.1%)
- **Autosomal Dominant Polycystic Kidney Disease (APCKD):** 11 patients (19.3%)
- **Post-Streptococcal Glomerulonephritis (PSGN):** 7 patients (12.3%)
- **Renal Atrophy:** 5 patients (8.8%)
- **Other causes:** Glomerulonephritis, urinary tract anomalies, pyelonephritis, and prostate cancer accounted for the remaining cases(12.2%).

Figure 1: Distribution of Primary Causes of CKD



4.3 Duration of CKD and Dialysis

- Average CKD duration: 13.7 years
- Average dialysis duration: 7.4 years
- Longest duration of dialysis: 20 years
- Shortest duration of dialysis: 30 days

4.4 Comorbidities

The most common comorbidities observed were:

- **Hypertension (HTN):** 37 patients (64.9%)
- **Cardiovascular Diseases:**
  - Congestive Heart Failure (CHF): 8 patients (14%)
  - Ischemic Heart Disease (IHD): 12 patients (21.1%)

- **Left Ventricular Hypertrophy (LVH):** 6 patients (10.5%)
- **Cerebrovascular Accident (CVA):** 2 patients (3.5%)
- **Chronic Obstructive Pulmonary Disease (COPD):** 3 patients (5.3%)
- **Lung Fibrosis and Dementia:** Rare but noted in individual cases.

Table 2: Prevalence of Comorbidities in CKD Patients

Comorbidity	Prevalence (%)
Hypertension	64.9
Congestive Heart Failure (CHF)	14
Ischemic Heart Disease (IHD)	21.1
Left Ventricular Hypertrophy (LVH)	10.5
Cerebrovascular Accident (CVA)	3.5
Chronic Obstructive Pulmonary Disease (COPD)	5.3

5. Discussion

5.1 Hypertension and CKD

Hypertension was both a cause and a complication of CKD in many patients. Persistent high blood pressure exacerbates kidney damage, creating a vicious cycle of worsening renal function and cardiovascular risk.

5.2 Diabetes Mellitus and CKD

Diabetic nephropathy, characterized by hyperglycemia-induced damage to renal microvasculature, was a significant contributor to CKD. Early glycemic control is crucial to preventing progression to ESKD.

5.3 Polycystic Kidney Disease

APCKD, an inherited disorder, was the third leading cause of CKD in the sample. Patients with APCKD often presented with comorbid hypertension, increasing the complexity of management.

5.4 Cardiovascular Comorbidities

The high prevalence of CHF, IHD, and LVH underscores the interdependence of renal and cardiac health. The shared risk factors and pathophysiology necessitate coordinated care.

5.5 Statistical analysis

- **Hypertension as a cause of CKD:** 26.3%
- **Comorbidity prevalence:** Hypertension (64.9%), IHD (21.1%), CHF (14%)
- **Dialysis duration correlation:** Patients with longer CKD durations showed higher rates of cardiovascular complications ($p < 0.05$).

6. Conclusion

This study highlights the significant burden of CKD and its comorbidities among patients at Mesallata Central Hospital, Libya. Hypertension and diabetes mellitus were identified as the leading causes of CKD, while cardiovascular diseases such as CHF and IHD were the most prevalent comorbidities. The findings emphasize the need for early detection and comprehensive management strategies to mitigate complications and improve patient outcomes.

7. Recommendations

1. Develop and implement screening programs for early detection of hypertension and diabetes in high-risk populations.
2. Establish integrated care models to manage CKD and associated cardiovascular conditions.
3. Provide patient education on lifestyle modifications, including diet and exercise, to reduce disease progression.

4. Enhance access to advanced diagnostic tools and treatment options in regional healthcare centers.
5. Promote genetic counseling and screening programs for hereditary conditions such as APCKD.

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