

# The prevalence and characteristics of Acute Interstitial Nephritis (AIN) and Pyelonephritis in patients with Chronic Kidney Disease (CKD).

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## Background

The Australian Institute of Health and Welfare (AIHW) first report into acute kidney injury (AKI) describes increasing rates of AIN or pyelonephritis, based on ICD10 coding, as notably in younger females<sup>1</sup>. These analyses could not distinguish between AIN and pyelonephritis as ICD10 coding includes both AIN and pyelonephritis as one diagnostic code<sup>1</sup>.

We review the CKD.QLD Registry, a Queensland wide registry of patients with CKD, to assess if there is a predominance of young, female patients who have CKD caused by either AIN or pyelonephritis, and what comorbidities these conditions are associated with.

## Methods

The RBWH and Logan CKD.QLD registries (n=2,367) were reviewed to identify patients who had a diagnosis of AIN or pyelonephritis, either as the primary cause of their CKD or as an acute on chronic kidney injury.

These patients were categorised by the cause of their CKD as either primary AIN (AIN as the cause of the patient's CKD), AIN on CKD (AIN as an acute on chronic kidney injury), primary pyelonephritis (pyelonephritis as the cause of the patient's CKD) or pyelonephritis on CKD (pyelonephritis as an acute on chronic kidney injury).

A comparison group (CKD only) included patients who had neither an acute kidney injury (AKI) as the cause of their CKD or an acute on chronic kidney injury. Patient who had an AKI documented that was not AIN or pyelonephritis were excluded from the analysis (n=756).

The patient's age, gender, and comorbidities were recorded.

## Results

67 patients [3%, F:M = 2.94:1] had a diagnosis of AIN or pyelonephritis. 1,544 patients were in the comparator group, CKD only.

**Figure 1** demonstrates that there were higher proportions of females with AIN or pyelonephritis compared to patients with CKD only [F:M = 1:1] OR=2.75 p=<0.001. This female predominance was across all patient groups, most notably in patients with pyelonephritis on CKD.

**Figure 2** shows that there was no significant age difference between patients with AIN or pyelonephritis compared to those with CKD only [mean 64 years vs. 67 years p=0.938]. Pyelonephritis on CKD appeared to occur more commonly in younger patients, though there was no significant difference by age quintile in any CKD group.

**Figure 3** demonstrates significantly lower rates of diabetes in patients with AIN or pyelonephritis compared to those with CKD only. There was no difference in rates of arthritis by these groups. There was also no significant difference in rates of cancer, depression, gout or musculoskeletal disease by CKD group. Hypertension was common in all patient groups except in patients with Primary AIN [36% Primary AIN, 73% AIN on CKD, 78% Primary Pyelonephritis, 76% Pyelonephritis on CKD, 80% CKD only, p<0.01].

## Conclusions

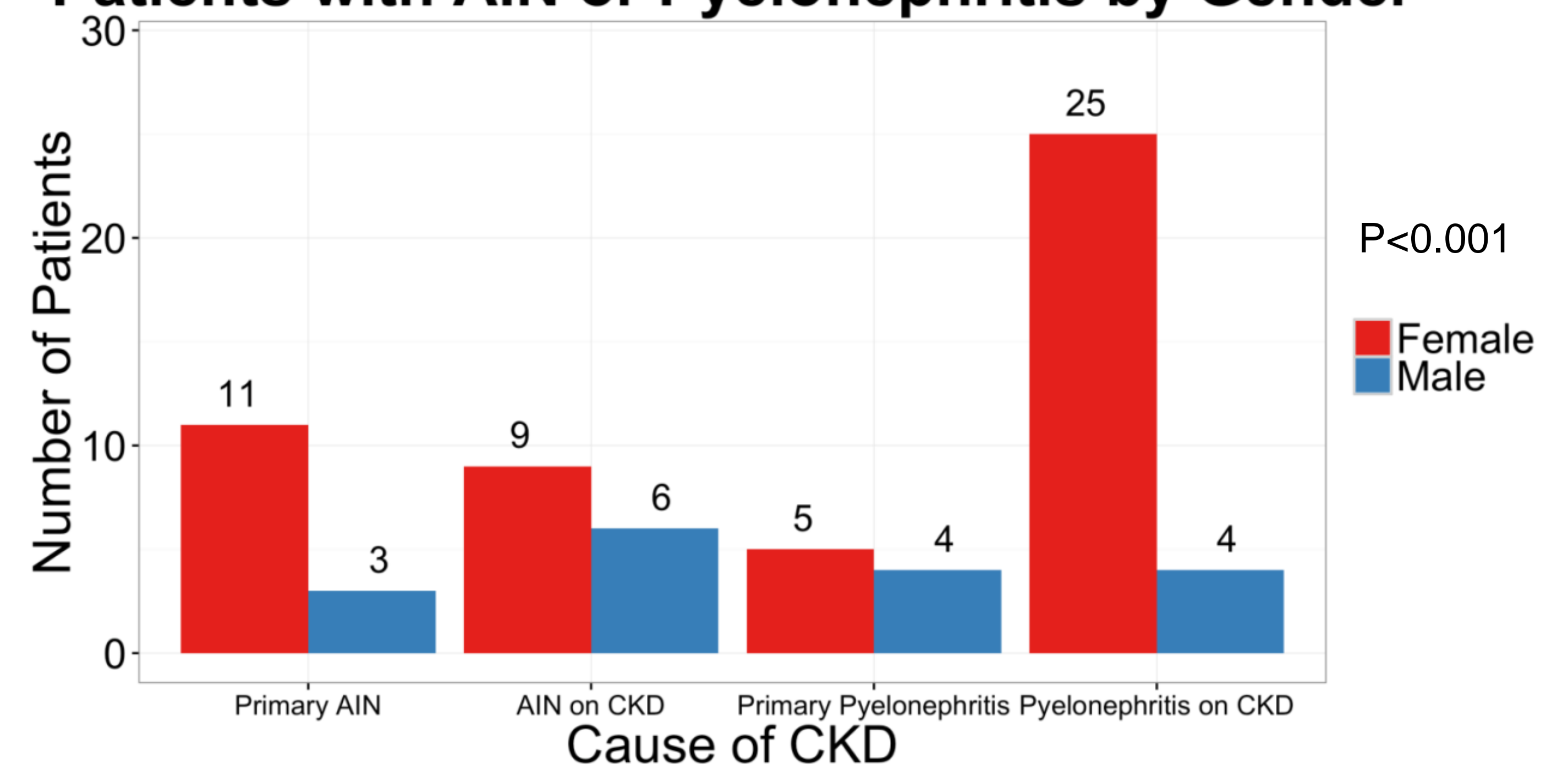
- Females have significantly higher rates of AIN and pyelonephritis as a cause of CKD.
- There were not significantly higher rates of AIN and pyelonephritis in younger patients.
- Rates of diabetes were significantly lower in patients with AIN or pyelonephritis compared to those with CKD only.
- These findings support the AIHW report that women have higher rates of AIN and pyelonephritis but it did not find an increased rate in younger patients.

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**Reference:** 1. Australian Institute of Health and Welfare. "Acute Kidney Injury in Australia: A First National Snapshot". 2015

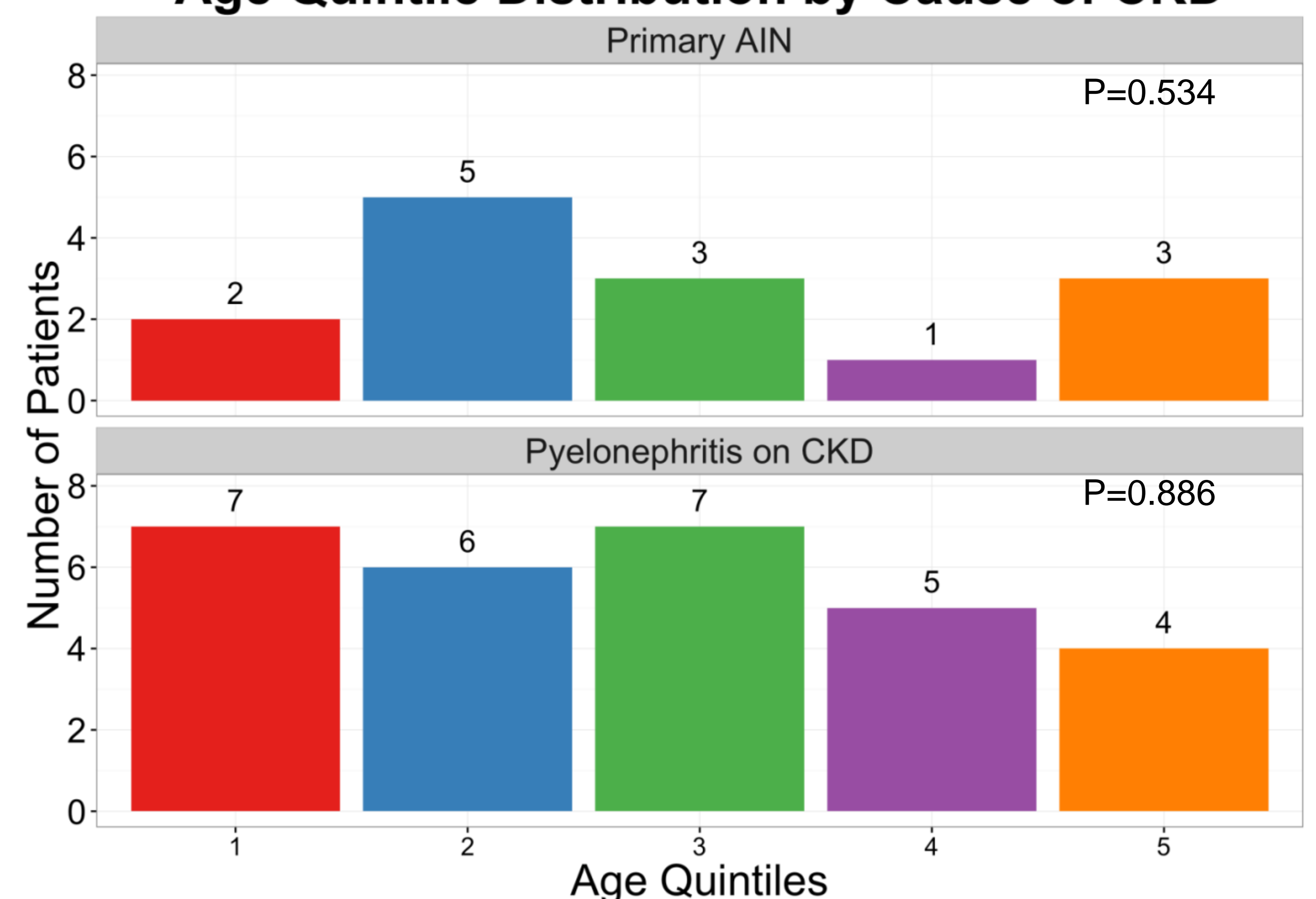
**Figure 1.**

**Patients with AIN or Pyelonephritis by Gender**



**Figure 2.**

**Age Quintile Distribution by Cause of CKD**



**Figure 3.**

**Prevalence of Comorbidities by Cause of CKD**

