Anemia Prevalence and Treatment Rates in Stage 3-5 Non-Dialysis-Dependent Chronic Kidney Disease Patients

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Introduction

- Non-dialysis-dependent chronic kidney disease (NDD-CKD) patients are at risk of anemia.
- While prevalence of anemia in dialysis patients is high, little is known about contemporary prevalence of anemia and its treatment patterns in the NDD-CKD population.

Objective

- Estimate anemia prevalence and characterize anemia treatment using the Truven MarketScan® database.

Methods

- The study population consisted of stage 3-5 NDD-CKD commercially insured patients aged 18 to 63 years in 2012 from the Marketscan® database.
- As shown in **Figure 1**, the baseline period, 1 year before the index date + 90 days, was used to define CKD stage, anemia, and comorbid conditions.

Methods

- CKD stage, anemia, and comorbid conditions were defined from ICD-9-CM diagnosis codes on one or more inpatient claims or two or more outpatient claims on different dates within 365 days.
  - Anemia was defined by diagnosis codes due to lack of hemoglobin values in the database.
- Anemia treatment was defined by drug codes and included erythropoiesis-stimulating agents (ESAs), intravenous (IV) iron, and red blood cell (RBC) transfusions on or after the first anemia diagnosis date during the baseline period.

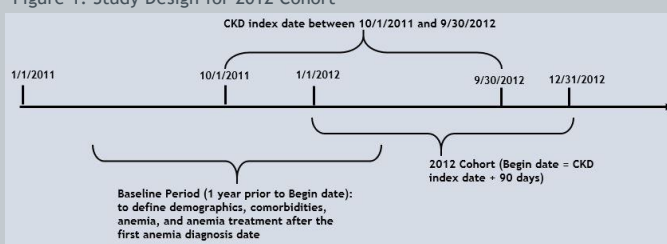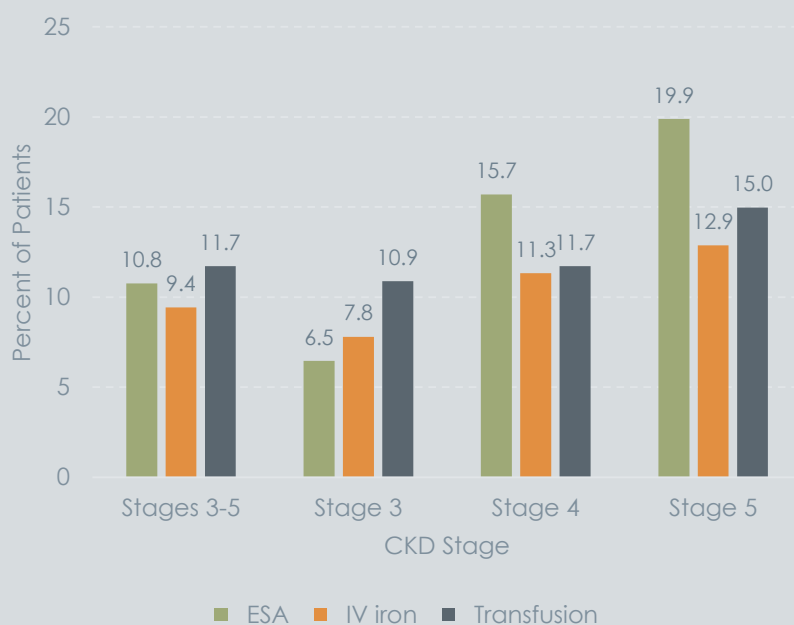

Figure 1: Study Design for 2012 Cohort

Results

- A total of 56,188 stage 3-5 NDD-CKD patients were identified (42,587 stage 3, 8,994 stage 4, and 4,607 stage 5).
- Anemia prevalence
  - Overall was 28.0% and increased by CKD stage (22.4% in stage 3, 41.3 % in stage 4, 53.9% in stage 5).
  - Increased by age and was significantly higher in women across all ages and CKD stages.
  - Highest among patients with a diagnosis of liver disease (52.2%) or congestive heart failure (47.9%) during the study period.
- Anemia treatment
  - Among all stage 3-5 NDD-CKD patients with anemia, RBC transfusions were the most commonly used (11.7%), followed closely by ESAs (10.8%), and IV iron (9.4%), however, these trends varied by CKD stage (Figures 2, 3).
  - ESA use increased by CKD stage, from 6.5% in stage 3 to 19.9% in stage 5.
  - RBC transfusions were the most common treatment for stage 3 NDD-CKD patients.
  - IV iron treatment was generally lower, also increasing by stage, ranging from 7.8% to 12.9%.
  - A smaller percentage of patients received more than one anemia treatment modality (Figure 3). Among stage 3-5 NDD-CKD patients combined, 5.2% received more than one anemia treatment.

Table 1: Prevalence of Anemia in Stage 3-5 NDD-CKD Patients

	Stages 3-5	Stage 3	Stage 4	Stage 5
Overall Anemia Prevalence (%)	28.0	22.4	41.3	53.9
Age category (%)				
18-44 yrs	25.9	19.6	34.9	50.4
45-54 yrs	27.0	21.4	40.1	50.6
55-59 yrs	28.5	23.0	41.5	56.4
60-63 yrs	28.9	23.3	44.2	56.8
Gender (%)				
Male	23.7	18.5	35.1	50.5
Female	33.6	27.5	48.5	58.3
Comorbidities (%)				
ASHD	39.7	33.0	51.3	65.3
CHF	47.9	40.3	57.8	69.1
CVA/TIA	44.9	38.3	55.3	67.6
PVD	49.6	42.6	60.7	69.5
Cardiac (other)	48.5	41.5	60.7	67.9
COPD	43.5	37.6	54.1	67.2
Liver disease	52.2	44.9	60.5	70.3
Dysrhythmia	44.4	37.4	56.4	67.6
Cancer	41.7	35.3	57.8	69.2
Diabetes	33.7	27.4	46.4	59.1
Hypertension	31.0	24.9	44.2	57.6
Inflammatory conditions (%)				
Glomerulonephritis	44.1	34.7	52.8	75.0
Chronic infections	56.2	48.7	70.7	72.4
Crohn's disease	50.3	47.2	53.4	65.9
Ulcerative colitis	55.0	48.9	62.0	83.8
Hepatitis C	48.2	42.8	50.4	62.7
Gout	32.2	26.0	43.8	59.6
Rheumatoid arthritis	39.8	35.9	55.6	53.9
Markers of frailty (%)				
Durable medical equipment*	52.4	46.4	62.4	67.9
Home health & hospice	40.9	34.4	53.0	63.1
Depression or dementia	39.5	33.4	55.9	61.9
Hip fracture	85.7	78.7	100.0	87.0

* Bed, oxygen, wheelchair, walker, enteral nutrition; ASHD-Atherosclerotic heart disease; CHF-Congestive heart failure; COPD-Chronic obstructive pulmonary disease; CVA/TIA-Cerebrovascular accident/transient ischemic attack; PVD-Peripheral vascular disease.

Figure 2: Anemia Treatment Patterns in Stage 3-5 NDD-CKD Patients with Anemia

Figure 3: Venn Diagrams of Anemia Treatment
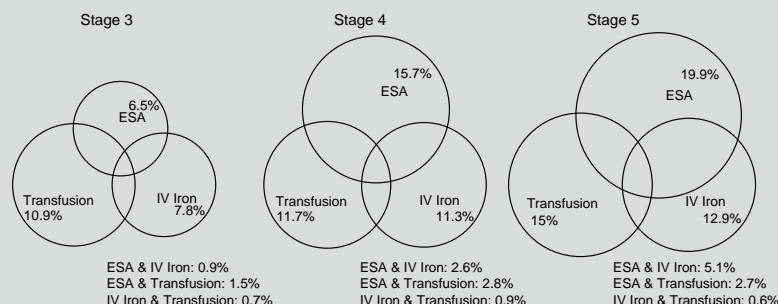
Conclusions

- Anemia prevalence increased by CKD stage and age, and women were more likely to be anemic.
- 26% of stage 3-5 NDD-CKD patients received treatment for anemia, and treatment patterns varied by stage.

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