

Kidney Stones and Osteoporosis: The Bone-Bowel-Kidney Axis



Elizabeth Kwenda, Lucy Jiang, Leticia Rodriguez, Juan Varela, Claisha Pruitt, Sarah Glover, Victoria Bird
 University of Florida College of Medicine, Department of Urology, Gainesville, FL, National Medical Association and Research Group, Division of Urology, Gainesville, FL



INTRODUCTION

- Chronic illnesses such as kidney stone formation (KSF) and Crohn's Disease (CD) pose a high cost to our health care system.
- The etiology of these diseases is multifactorial; however, calcium metabolism plays a role in the etiology of both disease. Osteoporosis and osteopenia are also closely tied to calcium metabolism.
- The goal of our study was to explore the prevalence of osteoporosis in the general population, kidney stone formers, patients with Crohn's Disease or both conditions in combination.

METHODS

- A retrospective review of the National Health and Nutrition Survey data (NHANES) and the large-scale bioinformatics database for integrated Biology and Bedside repository (i2b2) of the UF Healthy System was done to analyze the prevalence of osteoporosis in CD patient with KS and the general population aged 0-85 from November 2011 – September 2017.
- Our i2b2 cohort included de-identified male and female participants across all age groups found through data mining using ICD 9 and ICD 10 codes for our target diagnosis.
- Prevalence and univariate analysis were calculated. In our retrospective chart review, variables were analyzed using t-test and multivariate logistic regression analysis. Prevalence of CD, KSF, and osteoporosis in history was calculated. All statistical analyses were conducted using SASv.9.4

RESULTS

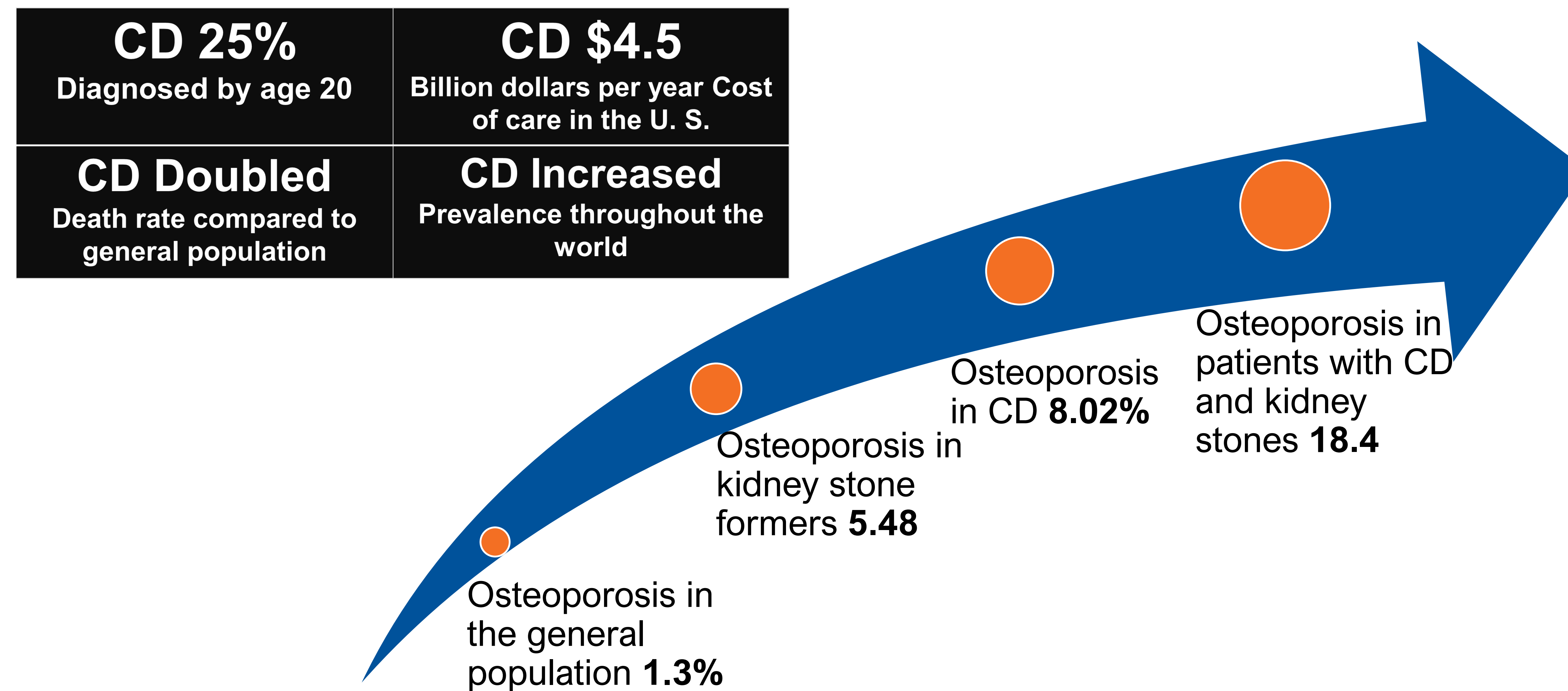


Fig 1. Crohn's Disease (CD) is frequently diagnosed in the young, a devastating disorder in which prevalence is increasing in the world, cost of care is high and mortality rates are doubled when compared to the general population. The prevalence of osteoporosis in males and females across all age groups in various disorders, N=1,002,357

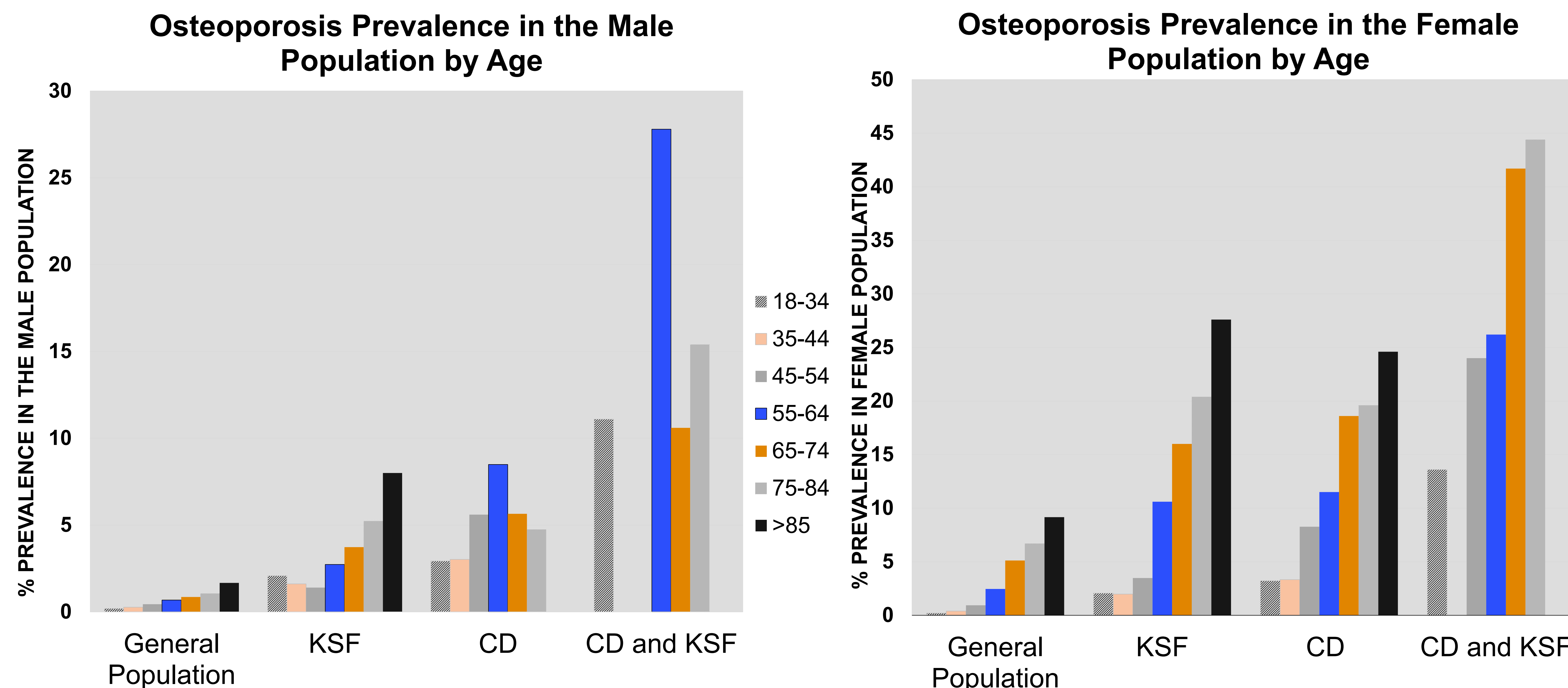


Fig 2. Osteoporosis prevalence in various disorders compared to the general population of men aged 18 and over, N= 372,658. 18-34 year old males have a higher prevalence of osteoporosis than the general population males over 85 years of age (1.67% vs 11.1% p<0.001).

Fig 3. Osteoporosis prevalence in various disorders compared to the general population in females aged 18 and over, N= 460,284. The 18-34 year old females have a higher prevalence of osteoporosis than the general population females over 85 years of age (13.6% vs. 9.6% p<0.001).

DISCUSSION

Osteoporosis in KSF and CD Patients

- In patients with CD and kidney stones concomitantly, the prevalence of osteoporosis was the highest at 18.4% (p<0.001).
- The prevalence of osteoporosis was the highest in women with CD and KS disease aged 75-84 at 44.4% and in males of the same group at 27.4% age 55-64 years of age.
- 18-34-year-old men and women with CD and KS had a higher prevalence of osteoporosis at, 13.6% and 11.1% respectively; compared to their over 85 years of age general population cohort (9.16 and 1.65% respectively)

KSF and Osteoporosis

- The prevalence of osteoporosis in patients that had kidney stones was 5.48% compared to the general population prevalence of 1.3% (p<0.001)

CONCLUSIONS

- There is a significant acceleration of premature bone in patients with kidney stones and CD.
- When both disorders were present the prevalence of osteoporosis was significantly higher in young female and male patients when compared to those older than 85 years of age in the general population.
- Future studies will seek to better understand the underlying pathophysiology of this synergistic relationship between IBD and kidney stones and their negative impact on bone metabolism.