

Hidden Factor Behind Kidney Disease Epidemic

References

1. Lazarus B, Chen Y, Wilson FP, et al. Proton Pump Inhibitor Use and the Risk of Chronic Kidney Disease. *JAMA Intern Med.* 2016;176(2):238-46.
2. Available at: <https://www.niddk.nih.gov/health-information/health-statistics/Pages/kidney-disease-statistics-united-states.aspx>. Accessed November 8, 2016.
3. Available at: https://www.kidney.org/news/ekidney/march11/CKDknowledge_March11. Accessed November 16, 2016.
4. Menon V, Wang X, Greene T, et al. Homocysteine in chronic kidney disease: Effect of low protein diet and repletion with B vitamins. *Kidney Int.* 2005;67(4):1539-46.
5. Nerbass FB, Draibe SA, Feiten SF, et al. Homocysteine and its determinants in nondialyzed chronic kidney disease patients. *J Am Diet Assoc.* 2006;106(2):267-70.
6. Abraham G, Sundaram V, Sundaram V, et al. C-Reactive protein, a valuable predictive marker in chronic kidney disease. *Saudi J Kidney Dis Transpl.* 2009;20(5):811-5.
7. Tonelli M, Sacks F, Pfeffer M, et al. Biomarkers of inflammation and progression of chronic kidney disease. *Kidney Int.* 2005;68(1):237-45.
8. Baylis C. Nitric oxide deficiency in chronic kidney disease. *Am J Physiol Renal Physiol.* 2008;294(1):F1-9.
9. Wever R, Boer P, Hijmering M, et al. Nitric oxide production is reduced in patients with chronic renal failure. *Arterioscler Thromb Vasc Biol.* 1999;19(5):1168-72.
10. Galil AG, Pinheiro HS, Chaoubah A, et al. Chronic kidney disease increases cardiovascular unfavourable outcomes in outpatients with heart failure. *BMC Nephrol.* 2009;10:31.
11. Perneger TV, Whelton PK, Klag MJ. Risk of kidney failure associated with the use of acetaminophen, aspirin, and nonsteroidal antiinflammatory drugs. *N Engl J Med.* 1994;331(25):1675-9.
12. Misurac JM, Knoderer CA, Leiser JD, et al. Nonsteroidal anti-inflammatory drugs are an important cause of acute kidney injury in children. *J Pediatr.* 2013;162(6):1153-9, 9.e1.
13. Abrams JE. *Revolutionary Medicine - The Founding Fathers and Mothers in Sickness and in Health.* New York: New York University Press; 2013.
14. Available at: <http://www.hcup-us.ahrq.gov/reports/statbriefs/sb44.jsp>. Accessed October 24, 2016.
15. Yang YX, Lewis JD, Epstein S, et al. Long-term proton pump inhibitor therapy and risk of hip fracture. *JAMA.* 2006;296(24):2947-53.
16. Ito T, Jensen RT. Association of long-term proton pump inhibitor therapy with bone fractures and effects on absorption of calcium, vitamin B12, iron, and magnesium. *Curr Gastroenterol Rep.* 2010;12(6):448-57.
17. Hoorn EJ, van der Hoek J, de Man RA, et al. A case series of proton pump inhibitor-induced hypomagnesemia. *Am J Kidney Dis.* 2010;56(1):112-6.
18. Cundy T, Mackay J. Proton pump inhibitors and severe hypomagnesaemia. *Curr Opin Gastroenterol.* 2011;27(2):180-5.
19. Heidelbaugh JJ. Proton pump inhibitors and risk of vitamin and mineral deficiency: evidence and clinical implications. *Ther Adv Drug Saf.* 2013;4(3):125-33.
20. Fournier MR, Targownik LE, Leslie WD. Proton pump inhibitors, osteoporosis, and osteoporosis-related fractures. *Maturitas.* 2009;64(1):9-13.
21. Andersen BN, Johansen PB, Abrahamsen B. Proton pump inhibitors and osteoporosis. *Curr Opin Rheumatol.* 2016;28(4):420-5.
22. Available at:
http://www.ema.europa.eu/docs/en_GB/document_library/Report/2012/04/WC500124972.pdf. Accessed November 9, 2016.
23. Yu EW, Bauer SR, Bain PA, et al. Proton pump inhibitors and risk of fractures: a meta-analysis of 11 international studies. *Am J Med.* 2011;124(6):519-26.

24. Eom CS, Park SM, Myung SK, et al. Use of acid-suppressive drugs and risk of fracture: a meta-analysis of observational studies. *Ann Fam Med*. 2011;9(3):257-67.
25. Roux C, Briot K, Gossec L, et al. Increase in vertebral fracture risk in postmenopausal women using omeprazole. *Calcif Tissue Int*. 2009;84(1):13-9.
26. Targownik LE, Lix LM, Metge CJ, et al. Use of proton pump inhibitors and risk of osteoporosis-related fractures. *Cmaj*. 2008;179(4):319-26.
27. Gray SL, LaCroix AZ, Larson J, et al. Proton pump inhibitor use, hip fracture, and change in bone mineral density in postmenopausal women: results from the Women's Health Initiative. *Arch Intern Med*. 2010;170(9):765-71.
28. Laheij RJ, Sturkenboom MC, Hassing RJ, et al. Risk of community-acquired pneumonia and use of gastric acid-suppressive drugs. *Jama*. 2004;292(16):1955-60.
29. Dial S, Delaney JA, Barkun AN, et al. Use of gastric acid-suppressive agents and the risk of community-acquired Clostridium difficile-associated disease. *Jama*. 2005;294(23):2989-95.
30. Termanini B, Gibril F, Sutliff VE, et al. Effect of long-term gastric acid suppressive therapy on serum vitamin B12 levels in patients with Zollinger-Ellison syndrome. *Am J Med*. 1998;104(5):422-30.
31. Valuck RJ, Ruscin JM. A case-control study on adverse effects: H2 blocker or proton pump inhibitor use and risk of vitamin B12 deficiency in older adults. *J Clin Epidemiol*. 2004;57(4):422-8.
32. Lam JR, Schneider JL, Zhao W, et al. Proton pump inhibitor and histamine 2 receptor antagonist use and vitamin B12 deficiency. *Jama*. 2013;310(22):2435-42.
33. Gomm W, von Holt K, Thome F, et al. Association of Proton Pump Inhibitors With Risk of Dementia: A Pharmacoepidemiological Claims Data Analysis. *JAMA Neurol*. 2016;73(4):410-6.
34. Available at:
http://www.hopkinsmedicine.org/healthlibrary/conditions/hematology_and_blood_disorders/anaemia_of_b12_deficiency_pernicious_anemia_85,P00080/. Accessed November 9, 2016.
35. Green R, Miller JW. Vitamin B12 deficiency is the dominant nutritional cause of hyperhomocysteinemia in a folic acid-fortified population. *Clin Chem Lab Med*. 2005;43(10):1048-51.
36. Available at: http://www.lifeextension.com/Magazine/2015/CE/CE_Turning-To-Stone/Page-01. Accessed November 10, 2016.
37. Hsu HH, Culley NC. Effects of dietary calcium on atherosclerosis, aortic calcification, and icterus in rabbits fed a supplemental cholesterol diet. *Lipids Health Dis*. 2006;5:16.
38. Available at: <http://www.fda.gov/Drugs/DrugSafety/DrugSafetyPodcasts/ucm245455.htm>. Accessed November 10, 2016.
39. Shih CJ, Chen YT, Ou SM, et al. Proton pump inhibitor use represents an independent risk factor for myocardial infarction. *Int J Cardiol*. 2014;177(1):292-7.
40. Charlot M, Ahlehoff O, Norgaard ML, et al. Proton-pump inhibitors are associated with increased cardiovascular risk independent of clopidogrel use: a nationwide cohort study. *Ann Intern Med*. 2010;153(6):378-86.
41. Shah NH, LePendu P, Bauer-Mehren A, et al. Proton Pump Inhibitor Usage and the Risk of Myocardial Infarction in the General Population. *PLoS One*. 2015;10(6):e0124653.
42. Blank ML, Parkin L, Paul C, et al. A nationwide nested case-control study indicates an increased risk of acute interstitial nephritis with proton pump inhibitor use. *Kidney Int*. 2014;86(4):837-44.
43. Antoniou T, Macdonald EM, Hollands S, et al. Proton pump inhibitors and the risk of acute kidney injury in older patients: a population-based cohort study. *CMAJ Open*. 2015;3(2):E166-71.
44. Geevasinga N, Coleman PL, Webster AC, et al. Proton pump inhibitors and acute interstitial nephritis. *Clin Gastroenterol Hepatol*. 2006;4(5):597-604.
45. Available at: <https://medlineplus.gov/ency/article/000464.htm>. Accessed November 10, 2016.
46. Klepser DG, Collier DS, Cochran GL. Proton pump inhibitors and acute kidney injury: a nested case-control study. *BMC Nephrol*. 2013;14:150.
47. Available at: <http://www.pharmaceutical-journal.com/learning/learning-article/interstitial-nephritis-caused-by-ppis/11117189.article>. Accessed November, 2016.

48. Xie Y, Bowe B, Li T, et al. Proton Pump Inhibitors and Risk of Incident CKD and Progression to ESRD. *J Am Soc Nephrol*. 2016;27(10):3153-63.
49. Available at: <https://www.niddk.nih.gov/health-information/health-communication-programs/nkdep/learn/causes-kidney-disease/at-risk/Pages/are-you-at-risk.aspx>. Accessed November 10, 2016.
50. Eckardt VF, Kanzler G, Bernhard G. Life expectancy and cancer risk in patients with Barrett's esophagus: a prospective controlled investigation. *Am J Med*. 2001;111(1):33-7.
51. Available at: <https://www.ncbi.nlm.nih.gov/pubmedhealth/PMHT0025308/>. Accessed November 10, 2016.
52. Spechler SJ. Barrett esophagus and risk of esophageal cancer: a clinical review. *Jama*. 2013;310(6):627-36.
53. Modiano N, Gerson LB. Barrett's esophagus: Incidence, etiology, pathophysiology, prevention and treatment. *Ther Clin Risk Manag*. 2007;3(6):1035-145.
54. Available at: <http://www.asge.org/press/press.aspx?id=554>. Accessed November 10, 2016.
55. Shaheen NJ, Falk GW, Iyer PG, et al. ACG Clinical Guideline: Diagnosis and Management of Barrett's Esophagus. *Am J Gastroenterol*. 2016;111(1):30-50; quiz 1.
56. Jacobson BC, Somers SC, Fuchs CS, et al. Body-mass index and symptoms of gastroesophageal reflux in women. *N Engl J Med*. 2006;354(22):2340-8.
57. Bhatia SJ, Reddy DN, Ghoshal UC, et al. Epidemiology and symptom profile of gastroesophageal reflux in the Indian population: report of the Indian Society of Gastroenterology Task Force. *Indian J Gastroenterol*. 2011;30(3):118-27.
58. Garavello W, Negri E, Talamini R, et al. Family history of cancer, its combination with smoking and drinking, and risk of squamous cell carcinoma of the esophagus. *Cancer Epidemiol Biomarkers Prev*. 2005;14(6):1390-3.
59. Fox M, Barr C, Nolan S, et al. The effects of dietary fat and calorie density on esophageal acid exposure and reflux symptoms. *Clin Gastroenterol Hepatol*. 2007;5(4):439-44.
60. Advances in GERD: Current Developments in the Management of Acid-Related GI Disorders. *Gastroenterology & Hepatology*. 2009;5(9):613-5.
61. Kaltenbach T, Crockett S, Gerson LB. Are lifestyle measures effective in patients with gastroesophageal reflux disease? An evidence-based approach. *Arch Intern Med*. 2006;166(9):965-71.
62. Available at: <https://www.niddk.nih.gov/health-information/health-topics/Anatomy/kidneys-how-they-work/Pages/anatomy.aspx>. Accessed November 10, 2016.
63. McClellan WM, Flanders WD. Risk factors for progressive chronic kidney disease. *J Am Soc Nephrol*. 2003;14(7 Suppl 2):S65-70.
64. Kazancioglu R. Risk factors for chronic kidney disease: an update. *Kidney Int Suppl (2011)*. 2013;3(4):368-71.
65. Mehdi U, Toto RD. Anemia, diabetes, and chronic kidney disease. *Diabetes Care*. 2009;32(7):1320-6.
66. Kurella M, Lo JC, Chertow GM. Metabolic syndrome and the risk for chronic kidney disease among nondiabetic adults. *J Am Soc Nephrol*. 2005;16(7):2134-40.
67. Luke RG. Hypertensive nephrosclerosis: pathogenesis and prevalence. Essential hypertension is an important cause of end-stage renal disease. *Nephrol Dial Transplant*. 1999;14(10):2271-8.
68. Ramkumar N, Cheung AK, Pappas LM, et al. Association of obesity with inflammation in chronic kidney disease: a cross-sectional study. *J Ren Nutr*. 2004;14(4):201-7.
69. Perazella MA. Renal vulnerability to drug toxicity. *Clin J Am Soc Nephrol*. 2009;4(7):1275-83.
70. Su T, Zhang L, Li X, et al. Regular use of nephrotoxic medications is an independent risk factor for chronic kidney disease--results from a Chinese population study. *Nephrol Dial Transplant*. 2011;26(6):1916-23.
71. Ishikawa A, Kawarasaki H, Ando K, et al. Renal preservation effect of ubiquinol, the reduced form of coenzyme Q10. *Clin Exp Nephrol*. 2011;15(1):30-3.
72. Gazdikova K, Gvozdjakova A, Kucharska J, et al. [Effect of coenzyme Q10 in patients with kidney diseases]. *Cas Lek Cesk*. 2001;140(10):307-10.
73. Lauretani F, Maggio M, Pizzarelli F, et al. Omega-3 and renal function in older adults. *Curr Pharm Des*. 2009;15(36):4149-56.

74. Fassett RG, Gobe GC, Peake JM, et al. Omega-3 polyunsaturated fatty acids in the treatment of kidney disease. *Am J Kidney Dis.* 2010;56(4):728-42.
75. Wang N, Qian P, Kumar S, et al. The effect of N-acetylcysteine on the incidence of contrast-induced kidney injury: A systematic review and trial sequential analysis. *Int J Cardiol.* 2016;209:319-27.
76. de Araujo M, Andrade L, Coimbra TM, et al. Magnesium supplementation combined with N-acetylcysteine protects against postischemic acute renal failure. *J Am Soc Nephrol.* 2005;16(11):3339-49.
77. Shlipak MG, Katz R, Sarnak MJ, et al. Cystatin C and prognosis for cardiovascular and kidney outcomes in elderly persons without chronic kidney disease. *Ann Intern Med.* 2006;145(4):237-46.
78. Pham CQ, Regal RE, Bostwick TR, et al. Acid suppressive therapy use on an inpatient internal medicine service. *Ann Pharmacother.* 2006;40(7-8):1261-6.
79. Heidelbaugh JJ, Kim AH, Chang R, et al. Overutilization of proton-pump inhibitors: what the clinician needs to know. *Therap Adv Gastroenterol.* 2012;5(4):219-32.
80. Reid M, Keniston A, Heller JC, et al. Inappropriate prescribing of proton pump inhibitors in hospitalized patients. *J Hosp Med.* 2012;7(5):421-5.
81. Ruffenach SJ, Siskind MS, Lien YH. Acute interstitial nephritis due to omeprazole. *Am J Med.* 1992;93(4):472-3.
82. Kuiper JJ. Omeprazole-induced acute interstitial nephritis. *Am J Med.* 1993;95(2):248.
83. Assouad M, Vicks SL, Pokroy MV, et al. Recurrent acute interstitial nephritis on rechallenge with omeprazole. *Lancet.* 1994;344(8921):549.
84. Available at:
http://www.imshealth.com/files/web/IMSH%20Institute/Reports/US_Use_of_Meds_2013/Treated_Patients_Selected_Therapies.pdf. Accessed November 14, 2016.
85. Forgacs I, Loganayagam A. Overprescribing proton pump inhibitors. *Bmj.* 2008;336(7634):2-3.
86. Bjornsson E, Abrahamsson H, Simren M, et al. Discontinuation of proton pump inhibitors in patients on long-term therapy: a double-blind, placebo-controlled trial. *Aliment Pharmacol Ther.* 2006;24(6):945-54.