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Lipska KJ, Ross JS, Wang Y, et al. National Trends in US Hospital Admissions for Hyperglycemia and Hypoglycemia Among Medicare Beneficiaries, 1999 to 2011. JAMA Intern Med. 2014; 174(7):1116-1124. doi:10.1001/jamainternmed.2014.1824.

Objective: To characterize changes in hyperglycemia and hypoglycemia hospitalization rates and subsequent mortality and readmission rates among patients 65 years old and above in the United States over a 12-year period, with comparison of these results according to age, sex, and race.

Hypothesis: The adoption of more intensive glycemic control strategies may have reduced rates of severe hyperglycemia but may have increased hypoglycemia.

Introduction: The increasing intensity of diabetes mellitus management over the past decade may have resulted in lower rates of hyperglycemic emergencies but higher rates of hospital admissions for hypoglycemia among older adults. Trends in these hospitalizations and subsequent outcomes are not known.

Methods: They used inpatient National Claims History files from the Centers for Medicare and Medicaid Services (CMS) to identify all fee-for-service (FFS) Medicare beneficiaries from 1999 to 2011 and excluded beneficiaries if they were younger than 65 years or were hospitalized or resided outside of the US. They examined the following 5 outcome measures: hyperglycemia and hypoglycemia hospitalization rates, subsequent 30-day and 1-year mortality, and 30-day readmission rates. Hospitalizations for hyperglycemia and hypoglycemia were defined as admissions to an acute care hospital for a principal discharge diagnosis of hyperglycemia or hypoglycemia (Of note: observational stays and ED visits were not included). To determine 30-day and 1-year mortality the CMS vital status file was used. To generate 30-day all-cause readmission rates, we calculated the proportion of patients who were discharged alive, not transferred to another acute care hospital, and readmitted to any hospital within 30 days of discharge. They examined the following characteristics of patients admitted for hyperglycemia and hypoglycemia in each year: age (65-74, 75-84, and ≥85 years), sex, race (white, black, other), and the presence of 20 key comorbidities.

Statistical Analysis: Multiple statistical tests and values were used to analyze the data including Mantel-Haenszel χ^2 test, risk-adjusted incidence rate ratio, odds ratio, relative risk, and linear mixed-effects models.

Results: A total of 279,937 patients experienced 302,095 hospitalizations for hyperglycemia, and 404,467 patients experienced 429,850 hospitalizations for hypoglycemia between 1999 and 2011. During this time, rates of admissions for hyperglycemia declined by 38.6% while admissions for hypoglycemia increased by 11.7%. Trends were similar across age, sex, and racial subgroups, but hypoglycemia rates were 2-fold higher for older subgroup (≥75 years) when compared with younger subgroup (65-74 years), and admission rates for both hyperglycemia and hypoglycemia were 4-fold higher for black patients compared with white patients. The 30-day and 1-year mortality and 30-day readmission rates improved during the study period (1999 – 2011).

Conclusion: Hospital admission rates for hyperglycemia dramatically declined from 1999 to 2011 and are now surpassed by hospitalizations for hypoglycemia among older Medicare beneficiaries. Although admission rates for hypoglycemia have declined modestly since 2007, efforts to further reduce these hospitalizations, especially among black and older adults, are urgently needed. Evaluations of DM care quality based on achieved glycemic targets do not account for adverse consequences of treatment, such as hypoglycemia.

Limitations: This is a Retrospective observational study which limits the strength of the study as compared to a randomized prospective study. The study only looked at a subset of the population (Medicare FFS patients) and so

cannot be generalized to a broader population who might have different characteristics. The study did not include patients that were admitted for observation (less than 48 hours) to the hospital which leaves out a subset of patients being admitted to the hospital for hyperglycemia or hypoglycemia given that these patients can often be stabilized and discharged within those 2 days. They also did not capture emergency department visits and ambulance calls for hypoglycemia that did not lead to hospital admission. By calculating 30 day all-cause readmission rates they may have added readmissions that had no association with DM, or glycemic control. The study shows an increase percentage of hypoglycemia admissions between 1999 and 2011 but no recommendations to rectify the issue.