

Systematic Review of Heat-Related Effects on Diabetes Mellitus Treatment in Older Adults

Swati Bangalore, PharmD¹; Mary Barna Bridgeman, PharmD¹; Catherine Chen, MD²; Sidrah Rafiq, MD²; Matthew C. Bridgeman, MLS³; Daniel T. Abazia, PharmD¹

¹Ernest Mario School of Pharmacy, Rutgers, The State University of New Jersey, Piscataway, New Jersey USA; ²Rutgers-Robert Wood Johnson Medical School, ³Rutgers Health Science Library

Heat-related illnesses are increasingly prevalent, particularly in the context of rising global temperatures. Older adults (aged 65 years and older) with diabetes mellitus are physiologically vulnerable to elevated temperatures due to impaired thermoregulatory mechanisms and increased heat sensitivity, which may be exacerbated by medications. The objective of this systematic review was to analyze heat-related medication effects in older adults with diabetes mellitus. The databases queried included PubMed, Embase, Scopus, and Web of Science. The Covidence systematic review software was used to manage screening, selection, and extraction of articles. A total of 922 articles were screened, and 50 were selected for analysis. The results of the search and study inclusion process are reported and presented visually in a Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 flow diagram. ROBINS-I was used to conduct risk-of-bias assessments. Due to substantial heterogeneity, results were summarized narratively without meta-analysis. Extreme heat increases the risk of diabetes-related mortality and hospitalization, while worsening chronic kidney disease and increasing the risk of dehydration. The risk of serious heat-induced hypoglycemia increases with sulfonylurea and insulin use; insulin potency is reduced in response to heat stress; and SGLT2 inhibitors may increase risks of volume depletion. Older adults with diabetes mellitus remain susceptible to heat-related health effects. Healthcare providers must take heat stress into account when making clinical decisions. This project is supported by the NJ ACTS CREST Program, funded by NIH R25TR00477.

