G6PD DEFICIENCY AND DIABETES: AN UNDERRECOGNIZED LINK?

Understanding G6PD Deficiency

G6PD deficiency is an X-linked genetic disorder affecting red blood cells, leading to hemolysis under oxidative stress.

Approximately 400 million people globally are affected, with higher incidence in Mediterranean, African, and Asian populations.[1]

Potential Links Between G6PD Deficiency and Diabetes

Increased Risk

Studies suggest G6PD deficiency may elevate the risk of developing diabetes. Research in the Western Brazilian Amazon showed that **70.7%** of G6PD-deficient individuals had impaired fasting glucose or diabetes, compared to **29.3%** of non-deficient individuals.[2,3]

Oxidative Stress

Both conditions are associated with oxidative stress caused by increased cellular free radicals. This oxidative stress can impair both insulin secretion and action, which can establish a link between G6PD deficiency and the development of diabetes in advanced age.

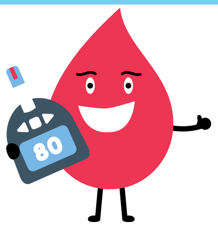
Impact on Diabetes Management

HbA1c Reliability and Complication Rates

G6PD deficiency can lead to **falsely low HbA1c readings**, complicating diabetes monitoring. A study reported that glycated hemoglobin levels markedly underestimated glucose levels in patients with G6PD deficiency.[4]

G6PD-deficient individuals with diabetes may experience **higher rates of complications**, including severe kidney failure and heart attack.[5]

Managment Recommendations



Perform frequent blood glucose testing to account for inaccuracies in HbA1c readings.

Avoid oxidative stress-inducing drugs to prevent hemolytic episodes.

Emphasize antioxidant-rich diets and regular exercise to mitigate oxidative stress.

References

1. G6PD RDTs. Accessed April 2, 2025. https://www.who.int/teams/global-malaria-programme/case-management/diagnosis/rapid-diagnostic-tests/g6pd-rapid-diagnostic-tests
2. Santana MS, Monteiro WM, Costa MRF, et al. High Frequency of Diabetes and Impaired Fasting Glucose in Patients with Glucose-6-Phosphate Dehydrogenase Deficiency in the Western Brazilian Amazon. Am J Trop Med Hyg. 2014;91(1):74-76. doi:10.4269/ajtmh.13-0032
3. Chang YL, Nfor ON, Chou YH, et al. Risk of diabetes mellitus based on the interactive association between G6PD rs72554664 polymorphism and sex in Taiwan Biobank individuals. Sci Rep. 2024;14(1):12802. doi:10.1038/s41598-024-63361-9
4. Israel A, Raz I, Vinker S, et al. Type 2 Diabetes in Patients with G6PD Deficiency. New England Journal of Medicine. 2024;391(6):568-569. doi:10.1056/NEJMc2406156
5. Israel A, Raz I, Green I, et al. Health disparities in diabetes treatment: The challenge of G6PD deficiency. Diabetes Research and Clinical Practice. 2025;219. doi:10.1016/j.diabres.2024.111965