Medical Xpress

New diabetes research links blood glucose levels and voice pitch

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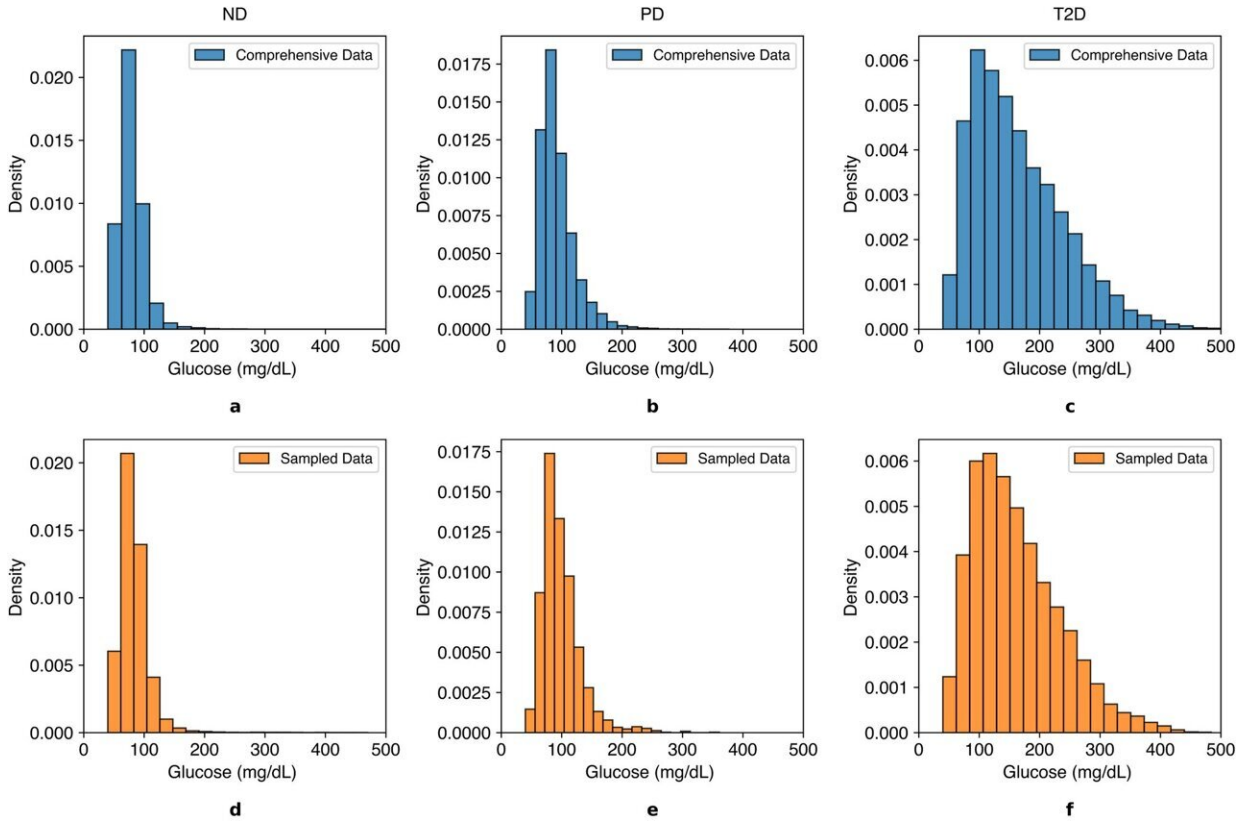

Glucose profiles of comprehensive and sampled CGM data corresponding to voice recordings. (a–c): Comprehensive CGM glucose profiles of ND, PD, T2D. (d–f): Sampled CGM data corresponding to voice recordings of ND, PD, T2D. (g–i): Cumulative distribution functions of glucose profiles from comprehensive and sampled data. The first column displays ND data, the second column displays PD data, the third column displays T2D data. ND, non-diabetic; PD, prediabetic; T2D, Type 2 diabetic. Credit: *Scientific Reports* (2024). DOI: 10.1038/s41598-024-69620-z

As part of its ongoing exploration of vocal biomarkers and the role they can play in enhancing health outcomes, Klick Labs published a new study in *Scientific Reports* today—confirming the link between blood glucose levels and voice pitch and opening the door to future advancements in non-invasive glucose monitoring for people living with type 2 diabetes.

In "Linear Effects of Glucose Levels on Voice Fundamental Frequency in type 2 diabetes and Individuals with Normoglycemia," researchers investigated how blood glucose levels influence the frequency of the voice in 505 participants across three glycemic statuses—non-diabetic, prediabetic, and type-2 diabetic.

Participants were fitted with continuous glucose monitors (CGMs) and recorded their voices multiple times daily for two weeks. The analysis revealed a linear relationship where an increase in CGM glucose levels corresponded to an increase in the fundamental frequency in the voice.

"By establishing a significant positive association between glucose levels and fundamental frequency, our study provides compelling justification for more research on using voice to predict and monitor glucose levels," said Jaycee Kaufman, lead author and scientist at Klick Labs.

"Whereas current glucose monitoring methods are often invasive and inconvenient, voice-based glucose monitoring could be as easy as talking into a smartphone, which could change the game for the estimated 463 million people around the world living with type 2 diabetes."

Klick Labs' latest research marks another step forward in its ongoing commitment to advancing the detection and management of diabetes using voice tech and machine learning. Their October 2023 study in

Mayo Clinic Proceedings: Digital Health demonstrated that voice and AI can screen for type 2 diabetes with high accuracy.

Previously, their "Screening for Impaired Glucose Homeostasis: A Novel Metric of Glycemic Control" research also appeared in *Mayo Clinic Proceedings: Digital Health* (May 2023), and their "Homeostasis as a proportional–integral control system" study was published in *Nature Digital Medicine* (May 2020).

More information: Jaycee Kaufman et al, Linear effects of glucose levels on voice fundamental frequency in type 2 diabetes and individuals with normoglycemia, *Scientific Reports* (2024). DOI: 10.1038/s41598-024-69620-z

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