Artificial-Intelligence-Augmented Telemedicine Applied to the Management of Diet-Treated Gestational Diabetes

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Objective:
Gestational diabetes (GD) confers an increased risk of complications as well as future type 2 diabetes. The implementation of the International Association of Diabetes and Pregnancy Study Groups/American Diabetes Association diagnosis criteria implies a huge increase in GD prevalence and, consequently, a significant increase in its management-related burden. We assess the safety and efficacy of an artificial intelligence (AI)-augmented telemedicine system (ruled-based reasoning) that includes a blood glucose (BG) classifier (C4.5 Quinlan decision tree) in comparison with the standard care in the management of GD while insulin is not required.

Method:
A randomized (2:1) controlled trial was performed. After downloading BG data and informing on ketonuria status and diet transgressions, the patient immediately receives (short message service) an evaluation including a proposal for diet adjustment when needed. Doctors are only alerted when the analysis concludes that insulin would be required.

Result:
We present the results of the 76 patients (50 users of the AI telemedicine system) who have completed the study. At baseline, groups were comparable regarding all the clinical variables tested. Patients download data every 3.4 (2.8–4) days, with a median of BG data transmitted = 106 (60–226). Mean number of BG values per day, mean BG and the percentage of BG values above 140 mg/dL, prepartum HbA_{1c}, as well as all the perinatal outcomes tested were similar between groups. The system performed 21 automated diet changes. Median number of face-to-face visits for diet-treated patients was 4.1 (4–7.5) for control group and 0 (0–0) for the active group ($P < 0.001$). An ad hoc questionnaire demonstrated a high degree of user satisfaction with the system.

Conclusion:
The AI-augmented telemedicine application developed can safely reduce the GD burden, guiding diet-treated patients without health caregiver intervention.