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Efficacy and Safety of Automated Insulin Delivery Systems in Patients with Type 1 Diabetes Mellitus: A Systematic Review and Meta-Analysis (*Diabetes Metab J* 2025;49:235-51)

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We appreciate the insightful comments by the reviewers on our recent article and are happy to clarify and discuss the points they raised [1]. Given the surge in clinical research on automated insulin delivery (AID) systems over the past 5 years and the concurrent absence of comprehensive evaluations of these systems, our study aims to include all eligible studies and conduct a thorough, integrated assessment of the efficacy and safety of AID systems. This approach inevitably introduces heterogeneity into the research, a characteristic that aligns with previous AID studies that included all populations [2,3]. To address this heterogeneity, we performed multiple subgroup analyses based on the following factors: intervention duration, hormone type, age, follow-up period, baseline glycosylated hemoglobin levels, remote monitoring, disease duration, AID system type, control group design, and algorithm type (Table 2 in the main text). Additionally, we conducted a sensitivity analysis to confirm the reliability of the results. Clinical heterogeneity across studies is understandable, as AID systems are inherently required to operate under variable clinical conditions from a practical standpoint.

We concur with the reviewers that a cost-effectiveness analysis of AID systems is essential. Emerging evidence from recent studies suggests that certain AID systems (e.g., Omnipod 5, Control IQ, and Cambridge algorithm-based systems) are cost-effective and potentially cost-saving for patients with type 1 diabetes mellitus (T1DM) [4-6]. However, broader evaluations across more AID systems, larger populations, and longer follow-ups are still needed to confirm generalizability.

The significance of any technological advancement lies in its ability to not only improve blood glucose control but also reduce psychological burden, thereby truly maximizing patient benefits and holding great clinical importance. Previous meta-analysis has demonstrated decreased diabetes distress and a tendency for reduced fear of hypoglycemia when using hybrid AID systems. However, no significant differences were observed in treatment satisfaction. This may be attributed to the fact that most studies included in the analyses still required manual bolus input [7]. With iterative algorithm updates, we believe that fully AID systems without carbohydrate counting will significantly reduce disease burden and improve psycho-

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logical outcomes. We have conducted preliminary analyses on fully AID systems, revealing improved diabetes treatment satisfaction (unpublished data).

Assessing AID systems in special populations remains a critical research priority. Existing evidence demonstrates the efficacy of AID technology in improving glycemic outcomes among pregnant women with T1DM [8]. Future studies should focus on underserved populations to enhance applicability by addressing their unique physiological/behavioral challenges.

Overall, we appreciate the constructive feedback from the reviewers and will consider these suggestions in future studies. These recommendations will enhance the generalizability of AID systems and effectively address the unmet clinical needs in this field.

CONFLICTS OF INTEREST

No potential conflict of interest relevant to this article was reported.

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