Translation of Personalized Decision Support into Routine Diabetes Care

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Abstract

Objective:
The aim of this study was to evaluate the impact of personalized decision support (PDS) on metabolic control in people with diabetes and cardiovascular disease.

Research Design and Methods:
The German health insurance fund BKK TAUNUS offers to its insured people with diabetes and cardiovascular disease the possibility to participate in the Diabetiva® program, which includes PDS. Personalized decision support is generated by the expert system KADIS® using self-control data and continuous glucose monitoring (CGM) as its data source. The physician of the participating person receives the PDS once a year, decides about use or nonuse, and reports his/her decision in a questionnaire. Metabolic control of participants treated by use or nonuse of PDS for one year and receiving CGM twice was analyzed in a retrospective observational study. The primary outcome was hemoglobin A1c (HbA1c); secondary outcomes were mean sensor glucose (MSG), glucose variability, and hypoglycemia.

Results:
A total of 323 subjects received CGM twice, 289 had complete data sets, 97% (280/289) were type 2 diabetes patients, and 74% (214/289) were treated using PDS, resulting in a decrease in HbA1c [7.10 ± 1.06 to 6.73 ± 0.82%; p < .01; change in HbA1c t0–t12 months -0.37 (95% confidence interval -0.46 to -0.28)] and MSG (7.7 ± 1.6 versus 7.4 ± 1.2 mmol/liter; p = .003) within one year. Glucose variability was also reduced, as indicated by lower high blood glucose index (p = .001), Glycemic Risk Assessment Diabetes Equation (p = .009), and time of hyperglycemia (p = .003). Low blood glucose index and time spent in hypoglycemia were not affected. In contrast, nonuse of PDS (75/289) resulted in increased HbA1c (p < .001). Diabetiva outcome was strongly related to baseline HbA1c (HbA1c t0; p < .01) and use of PDS (p < .01). Acceptance of PDS was dependent on HbA1c t0 (p = .049).

Conclusions:
Personalized decision support has potential to improve metabolic outcome in routine diabetes care.


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Abbreviations: (BMI) body mass index, (CI) confidence interval, (CGM) continuous glucose monitoring, (GRADE) Glycemic Risk Assessment Diabetes Equation, (HbA1c) hemoglobin A1c, (HbA1c t0) baseline HbA1c, (∆HbA1c) change in hemoglobin A1c t0–t12 months, (LBGI) low blood glucose index, (MSG) mean sensor glucose, (ns) not significant, (PDS) personalized decision support

Keywords: computerized medical decision support, continuous glucose monitoring, expert system, outpatient diabetes care, personalized advisory system

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