

Are Type 2 Diabetes Patients Who Self-Monitor Blood Glucose Special? The Role of Confounders in the Observational ROSSO Study

Hubert Kolb, Ph.D.,¹ Stephan Martin, M.D.,² Volker Lodwig, Ph.D.,³
Lutz Heinemann, Ph.D.,⁴ Werner A. Scherbaum, M.D.,⁵ and Berthold Schneider, Ph.D.⁶

Abstract

Background:

In the German multicenter, retrospective cohort study (ROSSO), those patients with type 2 diabetes who performed self-monitoring of blood glucose (SMBG) had a better long-term clinical outcome. We analyzed whether confounders accounted for the lower rate of clinical events in the SMBG cohort.

Methods:

ROSSO followed 3268 persons from diagnosis of type 2 diabetes for a mean of 6.5 years. Data were retrieved from patient files of randomly contacted primary care practices.

Results:

In total, more than 60 potential confounders were documented, including nondisease-associated parameters such as patient's health insurance, marital status, habitation, and characteristics of diabetes centers. There were only modest differences for these parameters between groups with versus without SMBG, and multiple adjustments did not weaken the association of SMBG use with better outcome (odds ratio 0.65, 95% confidence interval 0.53–0.81, $p < .001$). This was also true for subgroups of patients defined by type of antidiabetes treatment. Propensity score analysis confirmed the association of SMBG use with outcome. Using key baseline parameters, 813 matching pairs of patients were identified. The analysis again showed a better long-term outcome in the SMBG group (hazard ratio 0.67 $p = .004$).

Conclusion:

An influence of nonrecognized confounders on better outcome in the SMBG group is rendered improbable by similar results obtained with adjustments for disease-associated or disease-independent parameters, by the analysis of patient subgroups, by propensity score analysis and by performing a matched-pair analysis. The higher flexibility in pharmacological antidiabetes treatment regimens in the SMBG cohort suggests a different attitude of treating physicians and patients in association with SMBG.

J Diabetes Sci Technol 2009;3(6):1507-1515

Author Affiliations: ¹Hagedorn Research Institute, Gentofte, Denmark; ²West German Diabetes and Health Centre, Sana Clinics Gerresheim, Düsseldorf, Germany; ³Institute for Medical Informatics and Biostatistics, Basel, Switzerland; ⁴Profil Institute for Metabolic Research, Neuss, Germany; ⁵Department of Endocrinology, Diabetes, and Rheumatology, University Hospital Düsseldorf, Düsseldorf, Germany; and ⁶Institute for Biometry, Medical University of Hannover, Hannover, Germany

Abbreviations: (CI) confidence interval, (FBG) fasting blood glucose, (HbA1c) hemoglobin A1c, (HR) hazard ratio, (OAD) oral antidiabetes drug, (RCT) randomized controlled trial, (SMBG) self-monitoring of blood glucose

Keywords: confounder, diabetes complications, epidemiology, mortality, self-monitoring of blood glucose, type 2 diabetes

Corresponding Author: Hubert Kolb, Ph.D., Hagedorn Research Institute, DK 2820 Gentofte, Denmark; email address hubert.kolb@gmx.com