

Self-Monitoring Blood Glucose in Type 2 Diabetes: a Continuous Improvement Initiative



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Background

Self-monitoring blood glucose (SMBG) is a key tool for therapeutic decision and structured patient education. Despite there is evidence that SMBG improves metabolic control both in insulin-treated and in non insulin treated patients with type 2 diabetes (T2DM), the prescription and execution of SMBG is suboptimal and heterogeneous.

Aim

AMD Annals initiative is improving quality of diabetes care in Italy (*Acta Diabetol* 2015;52:557-71). This analysis aimed to assess the use of SMBG in patients with T2DM to evaluate frequency of SMBG, metabolic control, and hypo- and hyperglycemic episodes recorded in SMBG readings in the most frequent therapeutic schemes (with and without insulin).

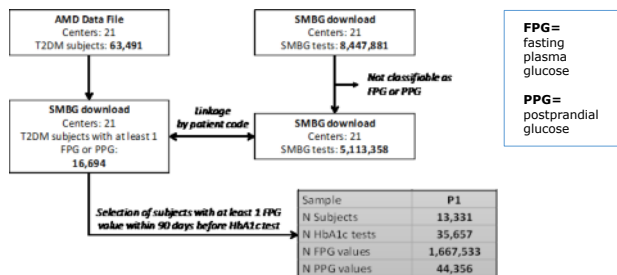
Method

The standardized AMD Annals methodology has been applied for the extraction of the information contained in the electronic medical records (EMR). Information included clinical data, therapies and all SMBG values downloaded on EMR by different glucose meters routinely used by the patients. Sample was constituted by T2DM patients with at least one HbA1c value during the years 2014 and 2015 and with at least 1 available SMBG value measured in the 90 days before the HbA1c test. Frequency of SMBG, levels of fasting and post-prandial blood glucose (FBG and PPG), and values below 70 and 50 e over 300 mg/dl were defined as new **quality of care indicators**.

Results

Overall 21 centers and 13,331 patients (accounting for 35,657 HbA1c tests) were included in the analysis (**figure 1**). Indicators were assessed in the therapeutic schemes identified as the most prevalent (**table 1 e figure 2**):

Figure 1: Data flow-chart

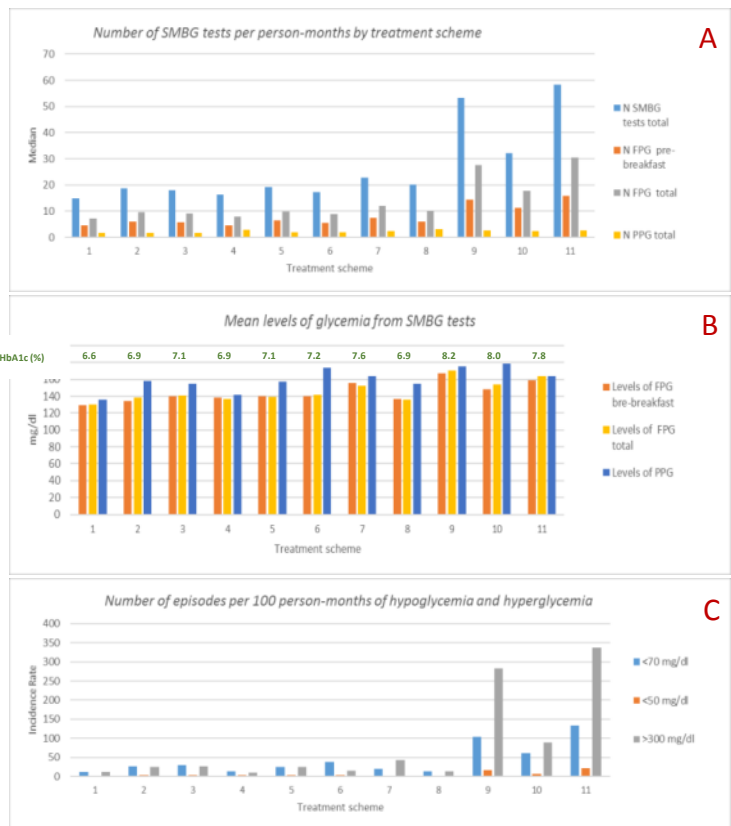


- 39.5% of SMBG tests could not be univocally classified as FBG or PPG (figure 1);
- Of those values which could be univocally classified, over 95% of SMBG tests were FBG values and less than 5% were PPG values (figure 1).
- SMBG is frequently recommended also to patients not treated with insulin (table 1);
- Frequency of SMBG is suboptimal in all treatment schemes; even patients treated with schemes including insulin monitored their glucose less than two times per day (figure 2 – Panel A);
- Pre-breakfast FBG values represented about 50% of all available FBG values in all treatment schemes (figure 2 – Panel A);
- The frequency of SMBG did not substantially differ among the most common schemes with oral agents, irrespective of the use of secretagogues (figure 2 – Panel A);
- The average PPG during three months was over 130 mg/dl in 49% to 88% of the cases in the different schemes;
- Average PPG was over 140 mg/dl in 47% to 75% of the cases;
- Substantial proportions of cases have elevated FBG and PPG, even though average HbA1c levels were often acceptable (figure 2 – Panel B);
- The use of therapeutic schemes including secretagogues was associated with a two to three-fold increased risk of glycemic values <70 mg/dl as compared to OHA schemes without secretagogues (figure 2 – Panel C);
- The use of insulin markedly increased the risk of hypoglycemia, with a relevant difference between basal insulin+OHA and basal+short-acting insulins with or without OHA. The same trends were also found as for glycemic values <50 mg/dl and >300 mg/dl.

Table 1: Most frequent therapeutic schemes and sample size

Treatment group	Treatment scheme	N (HbA1c test)	Prevalence within scheme (%)	Code in Fig. 2
Oral monotherapy	Metformin only	3188	63.8	1
	Sulphanilureas or Glinides only	685	13.7	2
Dual oral	Metformin + secretagogues	2929	56.2	3
	Metformin + DPP-IV inhibitor	612	11.9	4
>=triple oral	Metformin + secretagogues + DPP-IV	3132	72.5	5
	Metformin + secretagogues + Acarbose	337	7.8	6
GLP1-RA + other	GLP1RA + Metformin + Secretagogue	375	30.5	7
	GLP1RA + Metformin	516	42.0	8
Insulin+OHA	Basal insulin + Metformin + secretagogues	3486	33.4	9
	Basal insulin + Short Acting insulin + Metformin	1666	15.9	10
Insulin	Basal insulin + Short Acting	6842	76.7	11

Figure 2: Quality indicators of SMBG use and metabolic control by treatment scheme



Conclusions

- There is an urgent need to improve SMBG use in type 2 diabetes;
- AMD Annals initiative is working to increase the culture and the appropriate use of SMBG.



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[Italian]

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