

Evaluating glycaemic control of adults with type 2 diabetes mellitus in a large GP network in the Netherlands: a cross-sectional real-world database study using electronic medical records

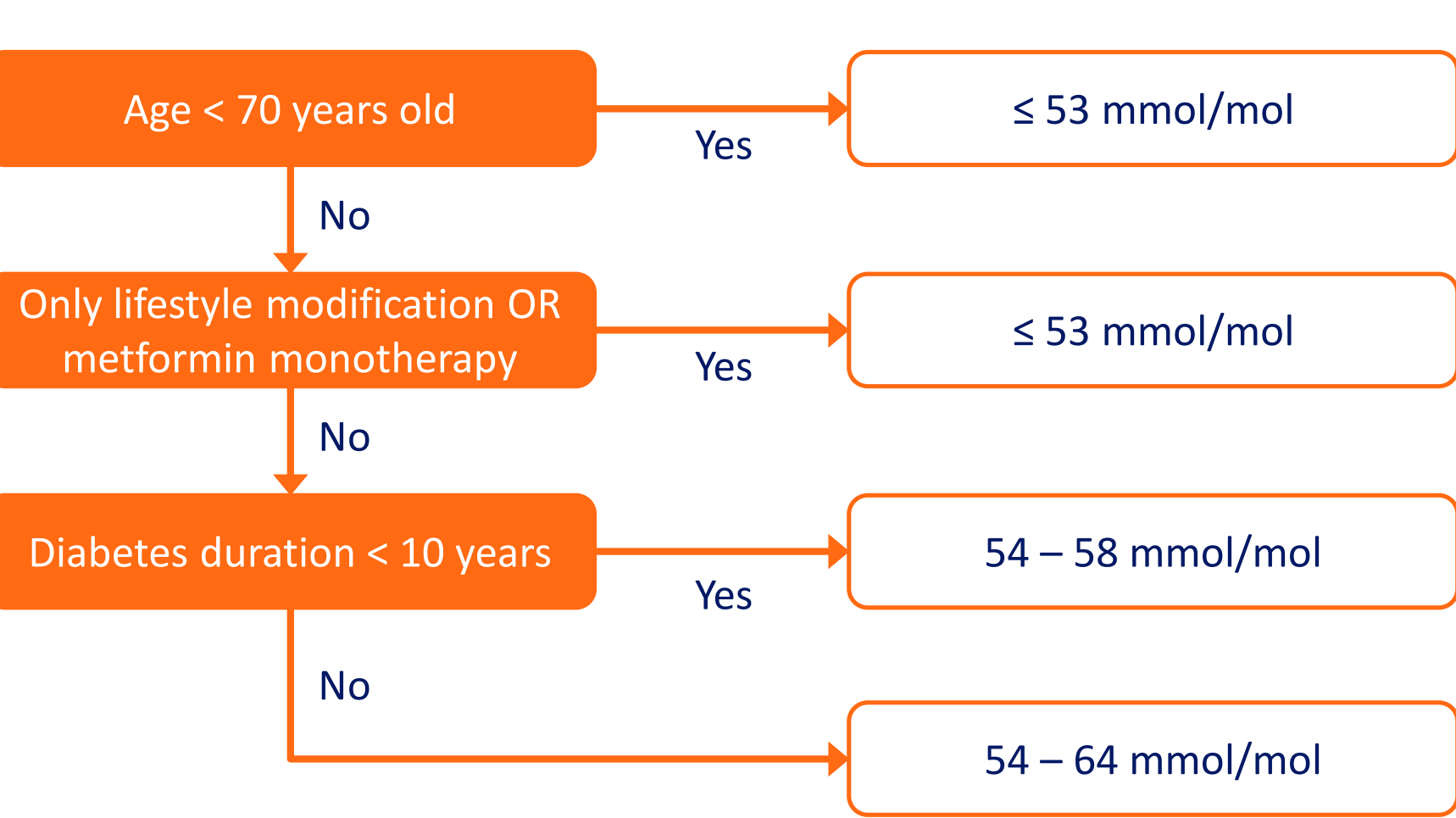
Introduction

- Previous landmark studies have shown that maintaining good glycaemic control can reduce the incidence of long-term complications in patients with type 2 diabetes mellitus (T2DM).¹
- In the Netherlands, HbA1c targets are 53, 54 – 58 or 54 – 64 mmol/mol, depending on age, treatment intensity and diabetes duration (Figure 1).²
- Insight in clinical outcomes, including glycaemic control, has always been a main focus within the GP network Zorggroep ZGWA.

Objectives

- To evaluate glycaemic control of T2DM patients within the GP network Zorggroep ZGWA, stratified by treatment regimen.
- Subgroup analyses were performed to evaluate whether gender and BMI had an impact on glycaemic control of the population.

Figure 1 Dutch HbA1c targets²



Methods

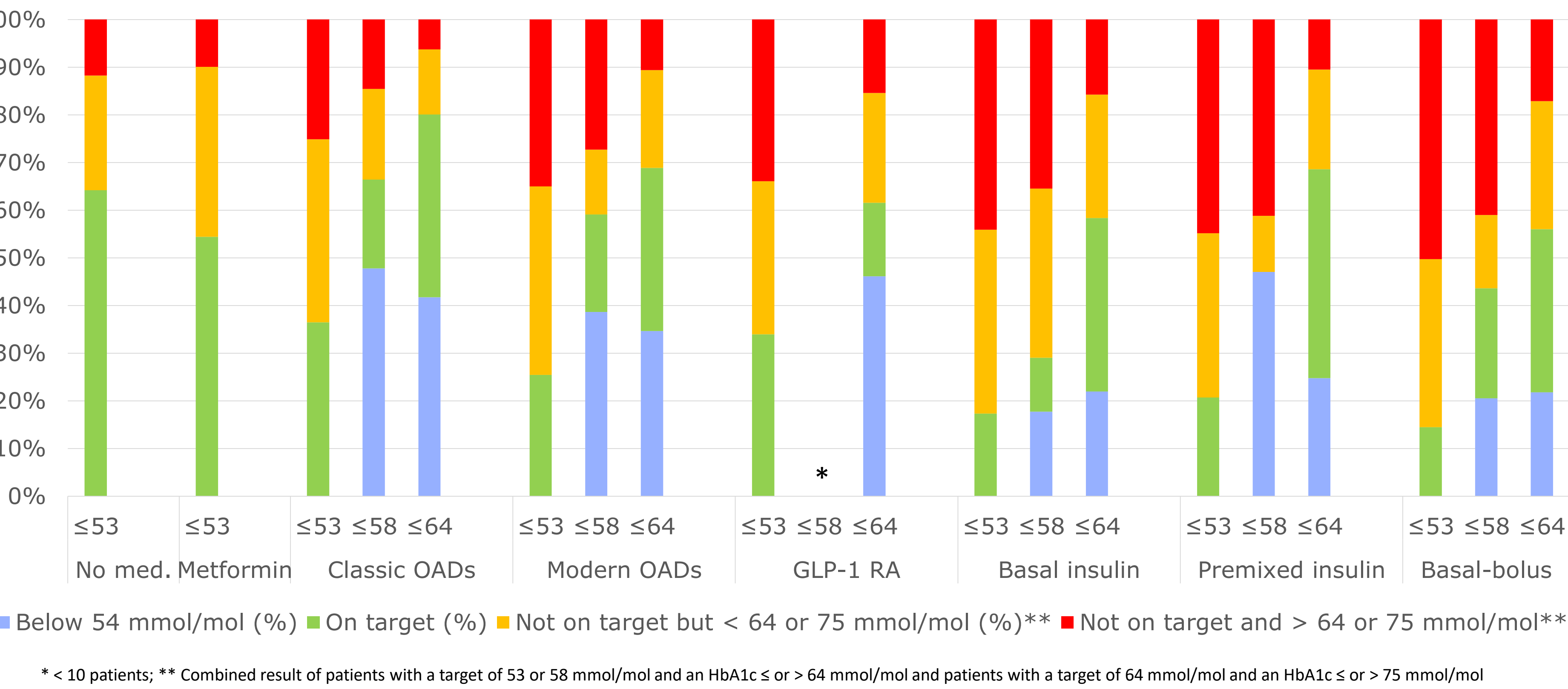
Medical dashboards within GP network ZGWA

- This study was a cross-sectional real-world database study using electronic medical records within GP network Zorggroep ZGWA.
- Within the ZGWA, GP register their actions in an electronic medical record system (CareSharing cKIS). The system allows them to share information with other health care professionals outside their clinic (i.e. at laboratories and hospitals).
- Medical information is collected centrally, cleaned of privacy data and updated on a daily basis.
- The resulting dataset is processed and analysed within quality assurance dashboards by an information provider (EscuLine B.V.) and is used by the GP network zorggroep ZGWA to monitor patient outcomes and other sets of parameters.
- One of the dashboards allows the GP network to evaluate glycaemic control of their entire T2DM population.

Data analysis

- Treatment and patient characteristics of adult patients with T2DM within the GP network ZGWA were extracted from the medical dashboard at June 25th, 2020.
- Patients were included if they had a recorded T2DM diagnosis and if they have had at least two HbA1c measurements within the last 36 months.
- Body mass index (BMI) was extracted or calculated using a patients’ height and weight.
- Individualized HbA1c targets were applied in line with Dutch guidelines (Figure 1)

Figure 2 Overview of patients on target, stratified by treatment regimen and HbA1c target



Data analysis (cont.)

- Treatment was categorized by:
 - No medicinal therapy
 - Metformin monotherapy
 - Other “classic” oral antidiabetic drugs (OADs) in any combination (SU, alpha glucose inhibitors, TZD, meglitinides, MET in combination with other OAD)
 - Modern OAD (DPP-4 and SGLT-2 inhibitor) in any combination
 - Basal insulin with or without OAD
 - Premixed insulin with or without OAD
 - Basal bolus insulin with or without OAD
 - GLP-1 receptor agonist (GLP-1 RA) in any combination
- Patients were categorised using a hierarchical approach, starting at the bottom of the list upwards.
- Per treatment category the following outcomes were defined:
 - The proportion of patients at target
 - The proportion of patients below target (i.e. below 54 mmol/mol), for patients with an HbA1c target of 54 – 58 mmol/mol or 54 – 64 mmol/mol
 - The proportion of patients above target but ≤64 mmol/mol for patients with a target ≤53 mmol/mol or 54 – 58 mmol/mol, and the proportion of patients above target but ≤75 mmol/mol for patients with a target 54 – 64 mmol/mol
 - The proportion of patients above target and >64 mmol/mol for patients with a target ≤53 mmol/mol or 54 – 58 mmol/mol, and the proportion of patients above target and >75 mmol/mol for patients with a target 54 – 64 mmol/mol
- Subgroup analyses were performed for males versus females, and for patients with or without obesity (BMI < 30 kg/m² and BMI ≥ 30 kg/m²).

Results

- 14.184 patients with T2DM were identified, of whom 53% were male and 41% had obesity (BMI ≥ 30 kg/m²).
- Table 1 shows patient characteristics of included patients.

Table 1 Overview of patient characteristics

	N	Males (%)	Age (years)	BMI ≥ 30 kg/m ² (%)
No medication	5,287	51%	70.1	40%
Metformin	4,108	53%	68.7	39%
Classic OADs	2,712	56%	69.4	42%
Modern OADs	675	54%	67.0	41%
GLP-1 RA	86	43%	63.9	84%
Basal insulin	696	50%	69.8	44%
Premixed insulin	151	43%	77.3	48%
Basal-bolus insulin	469	49%	72.6	44%
Total	14,184	53%	69.5	41%

Table 2 Proportions of patients reaching individualized HbA1c targets

Treatment	N	At target overall	At target ≤53*	At target ≤58*	At target ≤64*
No medication	5,287	64%	64%	n.a.	n.a.
Metformin	4,108	54%	54%	n.a.	n.a.
Classic OADs	2,712	59%	36%	66%	80%
Modern OADs	675	44%	25%	59%	69%
GLP-1 RA	86	45%	34%	**	62%
Basal insulin	696	36%	17%	29%	58%
Premixed insulin	151	57%	21%	47%	69%
Basal-bolus insulin	469	40%	14%	44%	56%
Total	14,184	57%	54%	58%	72%

* mmol/mol; ** < 10 patients

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Results (cont.)

- Overall, 57% of all patients reached their HbA1c target (Table 2 and Figure 2).
- 15% of patients were not on target and had an HbA1c > 64 mmol/mol while their target was 53 mmol/mol or 54 – 58 mmol/mol, or an HbA1c > 75 mmol/mol while their target was 54 – 64 mmol/mol. This may indicate that these patients are in need of a treatment or lifestyle intervention that improves glycaemic control.
- In those patients with a glycaemic target of 54 – 58 or 54 – 64 mmol/mol, 36% had an HbA1c < 54 mmol/mol, ranging from 21% with basal insulin to 50% with GLP-1ra). If these patients receive a treatment that can cause side effects like hypoglycaemia, it could indicate treatment may be adjusted to improve quality of life while still maintaining acceptable glycaemic control within the Dutch HbA1c targets.
- Goal attainment was similar in males versus females (56% versus 58% respectively) but lower in patients with a BMI ≥ 30 kg/m² versus BMI < 30 kg/m² (Table 3 and Table 4).

Table 3 Proportions of patients reaching individualized HbA1c targets (BMI < 30 kg/m²)

Treatment	N	At target overall	At target ≤53*	At target ≤58*	At target ≤64*
No medication	3,079	66%	66%	n.a.	n.a.
Metformin	2,470	56%	56%	n.a.	n.a.
Classic OADs	1,553	63%	40%	66%	81%
Modern OADs	390	48%	28%	54%	70%
GLP-1 RA	13	31%	20%	**	**
Basal insulin	388	40%	19%	25%	60%
Premixed insulin	75	60%	24%	**	76%
Basal-bolus insulin	256	42%	17%	44%	56%
Total	8,224	60%	57%	56%	73%

* mmol/mol; ** < 10 patients

Table 4 Proportions of patients reaching individualized HbA1c targets (BMI ≥ 30 kg/m²)

Treatment	N	At target overall	At target ≤53*	At target ≤58*	At target ≤64*
No medication	2,118	61%	61%	n.a.	n.a.
Metformin	1,610	51%	51%	n.a.	n.a.
Classic OADs	1,151	53%	33%	67%	79%
Modern OADs	280	38%	23%	63%	68%
GLP-1 RA	72	49%	38%	**	61%
Basal insulin	304	33%	16%	35%	55%
Premixed insulin	73	53%	17%	**	62%
Basal-bolus insulin	208	37%	13%	42%	56%
Total	5,816	53%	50%	60%	70%

* mmol/mol; ** < 10 patients

References

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2. Nederlands Huisartsen Genootschap (NHG). NHG-Standaard Diabetes mellitus type 2 (Vierde (partiele) herziening) 2018 [Available from: <https://www.nhg.org/standaarden/volledig/nhg-standaard-diabetes-mellitus-type-2>.

Conclusions

- Many T2DM patients achieve glycaemic control according to their individualized HbA1c targets.
- Fewer patients seem to achieve targets as the disease progresses and treatment intensifies. In addition, as expected, glycaemic control was lower in patients with BMI ≥ 30 kg/m² versus BMI < 30 kg/m².
- These results from the dashboard indicate a proportion of patients might benefit from more efficacious treatment options and lifestyle management to improve glycemic control.
- On the other hand, a proportion of elderly patients experiences an HbA1c below target. Especially if these patients receive medication which can cause hypoglycaemia (i.e. SU and insulin), they may benefit from a less intensive treatment regimen with a lower risk of hypoglycaemia to improve quality of life.
- A deep understanding of real-world outcomes allows the GP network to further optimize T2DM therapies in their population.

Acknowledgements

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