ORIGINAL ARTICLE

Is newly diagnosed type 2 diabetes treated according to the guidelines?

Results of the Polish ARETAEUS1 study

Małgorzata M. Bała[1,2], Ewa Płaczkiewicz-Jankowska[1], Roman Topór-Mądry[3,4], Wiktoria Leśniak[1,2], Roman Jaeschke[5], Jacek Sieradzki[6], Władysław Grzeszczak[7], Waldemar Banasiak[8]; the ARETAEUS Study Group

1 Polish Institute of Evidence Based Medicine, Kraków, Poland
2 II Department of Internal Medicine, Jagiellonian University Medical College, Kraków, Poland
3 IBMed, Institute of Medical Studies, Kraków, Poland
4 Institute of Public Health, Jagiellonian University Medical College, Krakow, Poland
5 McMaster University, Hamilton, Canada
6 Department of Metabolic Diseases, Jagiellonian University Medical College, Kraków, Poland
7 Department of Internal Medicine, Diabetology and Nephrology, Medical University of Silesia, Zabrze, Poland
8 Heart Disease Centre, Military Clinical Hospital, Wrocław, Poland

KEY WORDS

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Correspondence to: Małgorzata M. Bała, MD, PhD, II Katedra Chorób Wewnętrznych, Uniwersytet Jagielloński, Collegium Medicum, ul. Skawińska 8, 31-066 Kraków, Poland, phone: +48-12-29-34-236, fax: +48-12-29-34-030, e-mail: gosiabala@mp.pl

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ABSTRACT

INTRODUCTION There is a paucity of data on meeting treatment goals in patients with newly diagnosed type 2 diabetes (DM2).

OBJECTIVES The aim of the study was to characterize Polish patients with newly diagnosed DM2, to assess management of hyperglycemia, and to estimate the proportion of patients achieving the criteria of disease control recommended by the national clinical practice guidelines published in 2008.

PATIENTS AND METHODS ARETAEUS1 was a cross-sectional questionnaire-based study conducted in several regions of Poland in 2009 (January–April). It involved 1714 patients with DM2 of any age and sex, treated for less than 24 months, and recruited by randomly selected physicians.

RESULTS Only 28.9% of patients with DM2 met the goal for glycated hemoglobin (HbA_{1c}) control (<6.5%). In the total population, only 1.4% of all patients met all 3 goals (HbA_{1c}, blood pressure, and lipid levels), 12.5% – 2 goals, and 35.3% – only 1 goal; 50.7% did not meet any of the treatment goals. Achieving all of the treatment goals varied between the patient subgroups (in relation to the current diabetes treatment, age, sex, body mass index, and diabetes duration).

CONCLUSIONS Most patients with newly diagnosed DM2 do not meet all their major treatment goals, which indicates relatively low adherence to the national guideline recommendations for diabetes control and primary cardiovascular prevention in DM2. Metformin seems to be underused and titration of other glucose lowering medications may be insufficiently target-driven. Assuming that adherence to the current clinical practice guidelines is beneficial for patients, we recommend that both practitioners and patients have increased awareness of these guidelines and of the ways to achieve and maintain treatment goals.

INTRODUCTION Type 2 diabetes (DM2) carries a significant risk of cardiovascular disease, and in persons with newly diagnosed DM2 the risk of stroke is more than doubled in comparison with the general population.[1] This supports the need for the recognition and aggressive management of cardiovascular risk factors in the early stages of DM2. It was demonstrated that early intensive diabetes treatment is beneficial and reduces long-term risk of cardiovascular events and mortality.[2-4] There is a paucity of data on the extent to which treatment goals are met in patients

with DM2 of short duration. This is the first report from Poland. We have addressed the question whether the current diabetes care strategies are sufficient to achieve treatment goals in those patients. The ARETAEUS1 study was designed to describe a population of patients with DM2 diagnosed within the previous 2 years, and to assess the prevalence of cardiovascular risk factors, namely hypertension and lipid disorders. We also aimed to examine the pattern of medication use to control blood glucose in this group and to relate achieved levels of control to the current clinical practice guidelines (2008) of the Diabetes Poland (DP).[5] We have also assessed the presence of micro- and macrovascular diabetic complications at that stage of the disease.

PATIENTS AND METHODS A detailed description of the ARETAEUS1 study design, protocol, and patient characteristics, separately for patients recruited by non-diabetologists and diabetologists, was published previously.[6] Briefly, ARETAEUS1 was a cross-sectional questionnaire-based study conducted in the various regions of Poland in 2009 (January–April). The aim of the study was to characterize patients with newly diagnosed DM2 and to assess the proportion of patients achieving diabetic control goals recommended by the DP clinical practice guidelines 2008.[5] Newly diagnosed diabetes was defined as diabetes recognized within the 2 previous years and meeting the criteria outlined in DP clinical practice guidelines (consistent with those of the American Diabetes Association).[7]

The study included adult patients of any age and sex diagnosed with DM2 within the previous 2 years (after January 1, 2007). Patients had been recruited over 1 month-period and each physician was asked to recruit at least 5 patients fulfilling the inclusion criteria. A total of 1714 patients were recruited by 333 clinicians who agreed to participate and returned questionnaires (227 non-diabetologists, mainly working in primary health care institutions and 106 specialists in diabetology [specialists or physicians who completed their training in diabetology and who work in diabetes outpatient clinics]). The questionnaires were completed by physicians and no data was obtained directly from the patients. A random sample of clinicians stratified according to the size of the place of residence (5 categories) was drawn from a database including about 85% of all physicians registered in Poland.

The anonymous questionnaire contained questions regarding DM2 patients: demographic data, cardiovascular medical history (cardiovascular events, hypertension, and lipid disorders according to the report of a participating physician), medical history concerning diabetes (duration, complications according to the report of a participating physician), test results (office blood pressure, glycated hemoglobin [HbA_{1c}] and lipid levels), as well as treatment of diabetes, hyperlipidemia and hypertension (details of hyperlipidemia and hypertension treatment will be reported in a separate publication).

Statistical methods We compared proportions of patients achieving treatment goals in the subgroups with the χ^2 test. For the comparison of the means, the *t* test was used for normal distribution, and the Mann-Whitney test and Kruskal-Wallis test for nonnormal distribution of the variables. The distribution was estimated on the basis of skewness coefficient and graphical picture. The *t* test for equal or nonequal variances was used depending on the result of the Levene's test. All statistical analyses were conducted using the SPSS 14.0 software.

TABLE 1 Characteristics of the patient population in the ARETAEUS1 study

women, % (n)			50 (857)
age, mean (SD), y			60 (11.06)
time from diabetes diagnosis, mean (SD), mo			9.8 (7.6)
diabetes		<30 days, % (n)	11.5 (196)
		≥30–90 days, % (n)	15.0 (255)
		>90–180 days, % (n)	14.0 (238)
		180–545 days, % (n)	40.6 (690)
		>545–759 days, % (n)	18.9 (321)
BMI	mean (SD), kg/m^2		30.6 (4.9)
	proportions, n = 1689	<25 kg/m^2, % (n)	10.4 (176)
		25–30 kg/m^2, % (n)	37.4 (636)
		>30 kg/m^2, % (n)	51.9 (877)
waist circumference, mean (SD), cm		women	96.4 (13.4)
		men	103.1 (12.7)
HbA_{1c} level, median (IQR), %			7.1 (1.54)
total cholesterol, median (IQR), mmol/l, n = 1580			5.34 (1.55)
LDL cholesterol, mean (SD), mmol/l, n = 1261			3.3 (1.01)
HDL cholesterol, mean (SD), mmol/l		women, n = 659	1.28 (0.32)
		men, n = 663	1.19 (0.32)
triglycerides, median (IQR), mmol/l, n = 1486			1.81 (0.97)
BP, mean (SD), mmHg, n = 1696		systolic	137 (17)
		diastolic	83 (10)
fulfilling criteria for metabolic syndrome[a], %, n = 1544			83.3
diabetic retinopathy, % (n)			17.2 (181)
diabetic nephropathy, % (n)			7.4 (76)
diabetic foot, % (n)			1.8 (19)

a metabolic syndrome criteria according to International Diabetes Federation[8]

Abbreviations: BMI – body mass index, BP – blood pressure, HbA_{1c} – glycated hemoglobin, HDL – high-density lipoprotein, IQR – interquartile range, LDL – low-density lipoprotein, SD – standard deviation

RESULTS Characteristics of all patients participating in the ARETAEUS1 study are presented in TABLE 1. The median levels of HbA_{1c} (available for 798 patients), total cholesterol, and triglycerides as well as the mean levels of low-density lipoprotein (LDL) cholesterol and blood pressure (listed in TABLE 1) were all above the thresholds recommended in the DP guidelines 2008 (current guidelines at the time when the study was conducted[5]; recommendations for HbA_{1c} <6.5% [according to

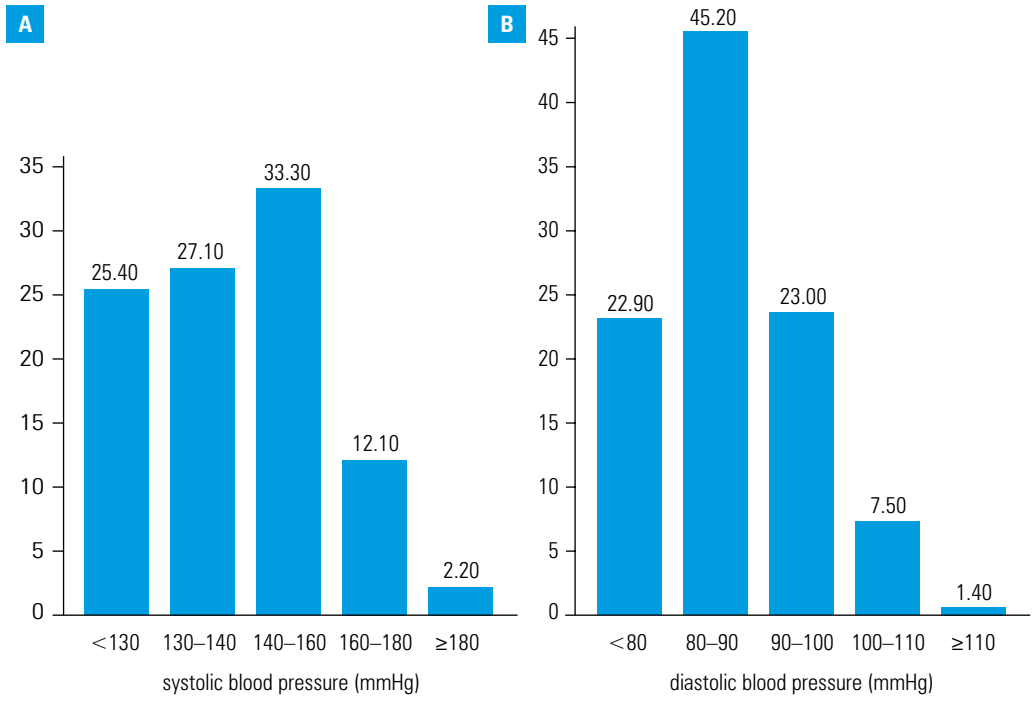

FIGURE 1 Distribution of systolic (A) and diastolic (B) blood pressure values in diabetic patients participating in the ARETAEUS1 study

the DP guidelines 2010 this threshold is applicable only in patients with diabetes of short duration, namely those enrolled to the study; otherwise it is 7.0%], for total cholesterol <4.5 mmol/l, for LDL cholesterol <2.6 mmol/l [or <1.8 mmol/l in patients with coronary heart disease], for triglycerides <1.7 mmol/l, and for blood pressure <130/80 mmHg).

Hypertension was reported in 78%, lipid disorders in 74%, and previous acute coronary syndromes in 10.5% of the patients. For distribution of systolic and diastolic blood pressure values see **FIGURE 1**. Diabetes complications were reported in 1.8% for diabetic foot, 7.4% for nephropathy, and 17.2% for retinopathy. The comparison of patients with and without diabetic complications showed that the former were older (63 vs. 59 years), had a higher mean HbA_{1c} level (7.6% vs. 7.36%), higher mean blood pressure (141/84 vs. 136/82 mmHg), and were more likely to have coronary heart disease (51.2% vs. 24.4%); no significant differences between those groups were found in regard to sex (women 51% vs. 52%), mean body mass index (BMI) (31.2 vs. 30.5 kg/m^2), or LDL cholesterol levels (3.4 vs. 3.13 mmol/l).

HbA_{1c} levels above or equal to 6.5% were reported in 71% of all patients; however, mean HbA_{1c} decreased with the duration of the disease (**TABLE 2**). When we considered less stringent threshold (<7%), 49.6% of the patients had lower HbA_{1c} levels.

Pharmacological treatment was administered in 96% of all patients: 32% were treated with metformin in monotherapy, 19% with sulfonylurea in monotherapy, 26% received metformin and sulfonylurea; all drug combinations are listed in **TABLE 3A**. Similar patterns were observed in the subgroups with HbA_{1c} below and above or equal to 6.5% and BMI above 30 kg/m^2. On the contrary, in the subgroup of patients with BMI below 25 kg/m^2 more patients received sulfonylurea (38%) than metformin in monotherapy (15%); both metformin and sulfonylurea were given in 19% of those patients. In the subgroup of patients with BMI 25–30 kg/m^2, the percentages of those receiving metformin in monotherapy, metformin and sulfonylurea, or sulfonylurea in monotherapy were similar (28%, 25%, and 24%, respectively). Surprisingly, even though the proportion of patients treated with metformin increased steadily with increased BMI (from 36.9% of patients with BMI <25 to 73.9% of patients with BMI >30 kg/m^2), substantial proportion of patients in the group with the highest BMI was not using metformin while taking other oral hypoglycemic. Overall, among patients who were categorized as obese or overweight (89.6% of all patients), metformin was used in 64.3%. This medication was contraindicated in 3.6% of the patients and withdrawn due to side effects in 1.7%, with no significant difference between the subgroups with different BMI. When analyzed according to disease duration, metformin was found to be given in a similar mean daily dose, ranging from 1604 mg/day in diabetes treated for 30–90 days to 1638 mg/day in patients treated for >545 days; except for the dose given within the first 30 days from diagnosis (1423 mg/day), which was significantly lower. When we excluded patients without HbA_{1c} test performed within the previous 6 months and compared metformin dose in the groups with HbA_{1c} <6.5% (1550 mg/d) and ≥6.5% (1765 mg/d), we found no significant differences. Of note, across oral anti-diabetic medication treatment categories, the proportion of patients with HbA_{1c} below 6.5% was significantly higher in the subgroup on metformin alone (46.3%) than in the subgroups on other oral agents or combinations of oral agents (χ^2, P <0.0001). The analysis of the drug use according

TABLE 2 Glycemic control according to the duration of the disease in patients with newly diagnosed diabetes participating in the ARETAEUS1 study, % (n)

		HbA_{1c} <6.5%	HbA_{1c} ≥6.5%	HbA_{1c} <7%	HbA_{1c} ≥7%
overall population, n = 798		28.9 (231)	71.1 (567)	49.6 (396)	50.4 (402)
		HbA_{1c} <6.5%	HbA_{1c} ≥6.5%	HbA_{1c}, mean (SD)[a]	
duration of the disease, n = 669[b]	<30 days, n = 42	16.7 (7)	83.3 (35)	8.8 (2.3)	
	30–90 days, n = 85	12.9 (11)	87.1 (74)	8.2 (1.9)	
	>90–180 days, n = 100	39.0 (39)	61.0 (61)	7.3 (1.6)	
	>180–545 days, n = 312	30.8 (96)	69.2 (216)	7.2 (1.3)	
	>545 days, n = 130	30.8 (40)	69.2 (90)	7.2 (1.4)	

a significant difference between means in all subgroups divided by duration of the disease
b patients with HbA_{1c} measured earlier than 6 months before the study were excluded from the analysis

Abbreviations: see TABLE 1

TABLE 3A Current diabetes treatment according to HbA_{1c} levels and body mass index in patients with newly diagnosed diabetes participating in the ARATAEUS1 study, % (n)

Type of treatment	Overall population, n = 1714	HbA_{1c} <6.5%, n = 231	HbA_{1c} ≥6.5%, n = 567	BMI <25, n = 176	BMI 25–30, n = 637	BMI >30, n = 877
no antidiabetic drugs	4.2 (72)	2.2 (5)	3.2 (18)	4.5 (8)	3.6 (23)	4.6 (40)
metformin in monotherapy	31.7 (543)	46.3 (107)	22.6 (128)	15.3 (27)	28.1 (179)	37.7 (331)
sulfonylurea in monotherapy	19.0 (326)	16.0 (37)	12.2 (69)	38.1 (67)	24.2 (154)	11.1 (98)
metformin and sulfonylurea	26.2 (449)	22.9 (53)	32.3 (183)	19.3 (34)	25.1 (160)	28.5 (250)
metformin and insulin	4.4 (75)	1.7 (4)	6.7 (38)	1.7 (3)	3.8 (24)	5.2 (46)
sulfonylurea and insulin	0.9 (16)	1.7 (4)	0.9 (5)	0.6 (1)	1.4 (9)	0.7 (6)
metformin and other drug (not sulfonylurea or insulin)	2.0 (35)	0.4 (1)	3.5 (20)	0.6 (1)	1.9 (12)	2.5 (22)
sulfonylurea and other drug (not metformin or insulin)	1.1 (18)	0.9 (2)	1.6 (9)	1.1 (2)	1.3 (8)	0.9 (8)
insulin in monotherapy	5.7 (97)	5.2 (12)	8.6 (49)	15.9 (28)	5.2 (33)	3.8 (33)
other drug or drug combinations	4.8 (83)	2.6 (6)	8.5 (48)	2.8 (5)	5.5 (35)	4.9 (43)

Abbreviations: see TABLE 1

to the duration of the disease and HbA_{1c} level demonstrated that with longer duration of the disease, more patients were receiving antidiabetic drugs, and the proportion of patients receiving metformin in monotherapy or metformin and sulfonylurea increased, while the proportion of patients receiving sulfonylurea in monotherapy decreased (TABLE 3B).

TABLES 4A–D present the results of the analysis of the number (and type) of treatment goals reached in the total population and in the subgroups. The data for this outcome were available for 623 patients. In the total population, only 1.4% of all patients met all 3 goals, 12.5% – 2 goals and 35.3% – only 1 goal; 50.7% did not meet any of the treatment goals (TABLE 4A, FIGURE 2). TABLE 4A also presents the results in the subgroups, including patients who: 1) had diabetes for up to 1 year or for over 1 year, 2) fulfill and do not fulfill the criteria for metabolic syndrome, and 3) meet and do not meet blood pressure, HbA_{1c}, and LDL treatment goals. When we analyzed the subgroups of patients (by age, sex, duration of disease, type of comorbidities, type of diabetes treatment [the results in the subgroups divided by hypertension and lipid-lowering treatment will be presented elsewhere], etc. [TABLE 4B, C, D]) according to the number of the achieved treatment goals (HbA_{1c}, LDL, and BP levels), from 0 to 10.7% (usually between 1 and 2%) of the patients met all 3 treatment goals. We have also estimated the proportion of patients meeting the recommended goals for glucose control according to current diabetes treatment (TABLE 4B). In most subgroups, the percentage of patients not meeting any of the treatment goals was between 40% and 60%. The percentage of patients meeting 2 of 3 treatment goals was between 2.3% and 43.1% in different subgroups. In most subgroups, the percentage of patients meeting 2 treatment goals was between 10% and 20%. The percentage of patients meeting 1 out of 3 treatment goals ranged from about 18% to 60%. In most subgroups the percentage of patients meeting 1 treatment goal was between 30% and 40%.

DISCUSSION Newly diagnosed and early (first 2–5 years from diagnosis) DM2 is generally

TABLE 3B Current diabetes treatment in the total population and in the subgroups according to the duration of diabetes and HbA_{1c} level in patients with newly diagnosed diabetes participating in the ARETAEUS1 study[a], % (n)

Type of treatment	<30 days		30–90 days		>90–180 days		>180–545 days		>545 days	
	<6.5%, n = 7	≥6.5%, n = 35	<6.5%, n = 11	≥6.5%, n = 74	<6.5%, n = 39	≥6.5%, n = 61	<6.5%, n = 96	≥6.5%, n = 216	<6.5%, n = 40	≥6.5%, n = 90
no antidiabetic drugs	0	11.4 (4)	9.1 (1)	6.8 (5)	2.6 (1)	0	2.1 (2)	1.9 (4)	0	3.3 (3)
metformin in monotherapy	28.6 (2)	31.4 (11)	45.5 (5)	29.7 (22)	33.3 (13)	21.3 (13)	52.1 (50)	20.8 (45)	47.5 (19)	24.4 (22)
sulfonylurea in monotherapy	28.6 (2)	5.7 (2)	36.4 (4)	10.8 (8)	20.5 (8)	9.8 (6)	12.5 (12)	14.8 (32)	12.5 (5)	10.0 (9)
metformin and sulfonylurea	0	17.1 (6)	9.1 (1)	28.4 (21)	28.2 (11)	36.1 (22)	25.0 (24)	33.3 (72)	25.0 (10)	27.8 (25)
metformin and insulin	14.3 (1)	5.7 (2)	0	6.8 (5)	5.1 (2)	3.3 (2)	0	6.0 (13)	2.5 (1)	11.1 (10)
sulfonylurea and insulin	0	0	0	1.4 (1)	7.7 (3)	0	0	0.9 (2)	2.5 (1)	1.1 (1)
metformin and other drug (not sulfonylurea or insulin)	0	0	0	4.1 (3)	0	4.9 (3)	1.0 (1)	4.2 (9)	0	2.2 (2)
sulfonylurea and other drug (not metformin or insulin)	0	0	0	0	0	0	1.0 (1)	2.8 (6)	0	1.1 (1)
insulin in monotherapy	14.3 (1)	20.0 (7)	0	5.4 (4)	0	8.2 (5)	4.2 (4)	7.9 (17)	10.0 (4)	11.1 (10)
other drug or drug combinations	14.3 (1)	8.6 (3)	0	6.8 (5)	2.6 (1)	16.4 (10)	2.1 (2)	7.4 (16)	0	7.8 (7)

a for this analysis patients with HbA1c measured earlier than 6 months before the study were excluded

Abbreviations: see **TABLE 1**

perceived as easy to control with oral medications, but data on adherence to the guidelines in this population are limited. This study provides updated information on cardiovascular risk profile and glucose-lowering treatment in patients with DM2 within 2 years from the diagnosis in clinical practice in Poland. Typical DM2 patients did not reach the clinical targets suggested in the DP guidelines; overall, as few as 28.9% of the patients with DM2 met the goal for HbA_{1c} control. On the other hand, 49.6% of the patients reached the level of less than 7%, which still indicates reasonable therapeutic success that would be more appreciated in the view of the concurrent 2010 DP recommendations.[9] Since 2008, when our study was performed, there has been

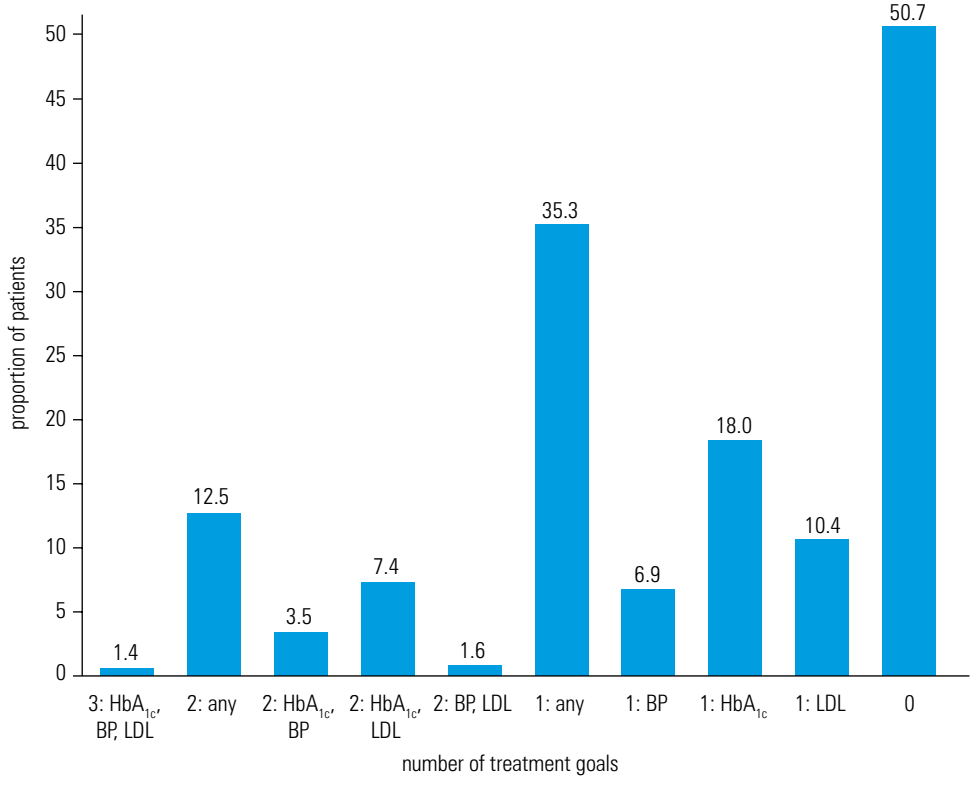

FIGURE 2 Proportions of diabetic patients participating in the ARETAEUS1 study meeting treatment goals (according to the Diabetes Poland guidelines 2008)
Abbreviations: see **TABLE 1**

TABLE 4A Meeting treatment goals in patients with newly diagnosed diabetes participating in the ARATAEUS1 study; results for the total population, % (n)

Characteristics	Number of patients in the subgroups[a]	3 treatment goals	only 2 treatment goals (excludes patients from the previous column who met all 3 goals)				only 1 treatment goal (excludes patients from the previous columns who met more than 1 goal)				0 treatment goals
		HbA_{1c}, BP, LDL	any	HbA_{1c} and BP	HbA_{1c} and LDL	BP and LDL	any	BP	HbA_{1c}	LDL	HbA_{1c}, BP, LDL, all above the recommended levels
total, n = 623[a]		1.4 (9)	12.5 (78)	3.5 (22)	7.4 (46)	1.6 (10)	35.3 (220)	6.9 (43)	18.0 (112)	10.4 (65)	50.7 (316)
fulfilling the criteria for metabolic syndrome	yes, n = 494	1.6 (8)	11.9 (59)	3.6 (18)	6.9 (34)	1.4 (7)	32.3 (159)	5.7 (28)	17.8 (88)	8.7 (43)	54.3 (268)
	no, n = 86[b]	0	16.3 (14)	3.5 (3)	10.5 (9)	2.3 (2)	44.2 (38)	12.8 (11)	16.3 (14)	15.1 (13)	39.5 (34)
BP	<130/80, n = 84	10.7 (9)	38.1 (32)	26.2 (22)	0[c]	11.9 (10)	51.2 (43)	51.2 (43)	0[c]	0[c]	0[c]
	≥130/80, n = 539[b]	0[c]	8.5 (46)	0[c]	8.5 (46)	0[c]	32.8 (177)	0[c]	20.8 (112)	12.1 (65)	58.6 (316)
HbA_{1c}	<6.5, n = 189	4.8 (9)	36.0 (68)	11.6 (22)	24.3 (46)	0[c]	59.3 (112)	0[c]	59.3 (112)	0[c]	0[c]
	≥6.5, n = 434	0[c]	2.3 (10)	0[c]	0[c]	2.3 (10)	24.9 (108)	9.9 (43)	0[c]	15.0 (65)	72.8 (316)
LDL	<2.6 mmol/l or if CHD <1.8, n = 130	6.9 (9)	43.1 (56)	0[c]	35.4 (46)	7.7 (10)	50.0 (65)	0[c]	0[c]	50.0 (65)	0[c]
	≥2.6 mmol/l or if CHD ≥1.8, n = 493	0[c]	4.5 (22)	4.5 (22)	0[c]	0[c]	31.4 (155)	8.7 (43)	22.7 (112)	0[c]	64.1 (316)
diabetes duration	≤1 year, n = 341	1.8 (6)	11.7 (40)	3.2 (11)	7.0 (24)	1.5 (5)	32.6 (111)	5.9 (20)	16.1 (55)	10.6 (36)	54.0 (184)
	>1 year, n = 277	1.1 (3)	13.4 (37)	4.0 (11)	7.6 (21)	1.8 (5)	39.0 (108)	8.3 (23)	20.2 (56)	10.5 (29)	46.6 (129)

a only the patients for whom data on all treatment goals were available
b significant difference between the 2 groups (i.e., fulfilling and not fulfilling criteria for metabolic syndrome)
c no matches because of the group characteristics

Abbreviations: CHD – coronary heart disease, others – see TABLE 1

How to read the table: In the first column the name of the subgroup (or the total population in TABLE 4A) is presented and in the second column subgroups (with number of patients in a subgroup) are presented (i.e., fulfilling the criteria for metabolic syndrome [yes], not fulfilling the criteria for metabolic syndrome [no], etc.); then, the percentage of patients with 3, any 2, specific 2, any 1 and specific 1, and none of the treatment goals met in each subgroups is presented.

TABLE 4B Meeting treatment goals in patients with newly diagnosed diabetes participating in the ARATAEUS1 study; results for the total population (n = 623[a]) according to current diabetes treatment received, % (n)

Characteristics	Number of patients in the subgroups[a]	3 treatment goals	Only 2 treatment goals (excludes patients from the previous column who met all 3 goals)			Only 1 treatment goal (excludes patients from the previous columns who met more than 1 goal)				0 treatment goals
		HbA_{1c}, BP, LDL	any	HbA_{1c} and BP	HbA_{1c} and LDL	BP and LDL	any	BP	HbA_{1c}	LDL	HbA_{1c}, BP, LDL, all above the recommended levels
metformin in monotherapy	yes, n = 184	1.1 (2)	16.3 (30)	4.9 (9)	9.2 (17)	2.2 (4)	45.1 (83)	3.8 (7)	33.2 (61)	8.2 (15)	37.5 (69)
	no, n = 439[b]	1.6 (7)	10.9 (48)	3.0 (13)	6.6 (29)	1.4 (6)	31.2 (137)	8.2 (36)	11.6 (51)	11.4 (50)	56.3 (247)
metformin and sulonylurea only	yes, n=184	1.6 (3)	11.4 (21)	3.3 (6)	7.1 (13)	1.1 (2)	29.3 (54)	5.4 (10)	11.4 (21)	12.5 (23)	57.6 (106)
	no, n = 439	1.4 (6)	13.0 (57)	3.6 (16)	7.5 (33)	1.8 (8)	37.8 (166)	7.5 (33)	20.7 (91)	9.6 (42)	47.8 (210)
metformin and insulin only	yes, n = 33	0	3.0 (1)	3.0 (1)	0	0	24.2 (8)	18.2 (6)	3.0 (1)	3.0 (1)	72.7 (24)
	no, n = 590[b]	1.5 (9)	13.0 (77)	3.6 (21)	7.8 (46)	1.7 (10)	35.9 (212)	6.3 (37)	18.8 (111)	10.8 (64)	49.5 (292)
metformin and other than sulfonylurea and insulin	yes, n = 17	0	0	0	0	0	17.6 (3)	5.9 (1)	5.9 (1)	5.9 (1)	82.4 (14)
	no, n = 606	1.5 (9)	12.9 (78)	3.6 (22)	7.6 (46)	1.7 (10)	35.8 (217)	6.9 (42)	18.3 (111)	10.6 (64)	49.8 (302)
insulin in monotherapy	yes, n = 51	0	15.7 (8)	7.8 (4)	5.9 (3)	2.0 (1)	35.3 (18)	15.7 (8)	7.8 (4)	11.8 (6)	49.0 (25)
	no, n = 572	1.6 (9)	12.2 (70)	3.1 (18)	7.5 (43)	1.6 (9)	35.3 (202)	6.1 (35)	18.9 (108)	10.3 (59)	50.9 (291)
insulin with any other drug	yes, n = 66	0	4.5 (3)	1.5 (1)	1.5 (1)	1.5 (1)	27.3 (18)	13.6 (9)	6.1 (4)	7.6 (5)	68.2 (45)
	no, n = 557[b]	1.6 (9)	13.5 (75)	3.8 (21)	8.1 (45)	1.6 (9)	36.3 (202)	6.1 (34)	19.4 (108)	10.8 (60)	48.7 (271)

a only the patients for whom data on all treatment goals were available
b significant difference between the 2 groups (i.e., metformin in monotherapy "yes" and "no")

How to read the table: see TABLE 4A

Abbreviations: see TABLES 1 and 4A

TABLE 4C Meeting treatment goals in patients with newly diagnosed diabetes participating in the ARATAEUS1 study; results for men (n = 364[a]), % (n)

Characteristics	Number of patients in the subgroups[a]	3 treatment goals	Only 2 treatment goals (excludes patients from the previous column who met all 3 goals)				Only 1 treatment goal (excludes patients from the 2 previous columns who met more than 1 goal)				0 treatment goals
		HbA_{1c}, BP, LDL	any	HbA_{1c} and BP	HbA_{1c} and LDL	BP and LDL	any	BP	HbA_{1c}	LDL	HbA_{1c}, BP, LDL, all above the recommended levels
age	<40, n = 20	0	10.0 (2)	0	10.0 (2)	0	50.0 (10)	15.0 (3)	10.0 (2)	25.0 (5)	40.0 (8)
	≥40, n = 283	0.4 (1)	13.1 (37)	4.2 (12)	8.1 (23)	0.7 (2)	35.0 (99)	7.1 (20)	17.3 (49)	10.6 (30)	51.6 (146)
BMI	<25, n = 26	0	23.1 (6)	3.8 (1)	15.4 (4)	3.8 (1)	50.0 (13)	7.7 (2)	23.1 (6)	19.2 (5)	26.9 (7)
	25–30, n = 96	2.1 (2)	14.6 (14)	5.2 (5)	8.3 (8)	1.0 (1)	36.5 (35)	8.3 (8)	16.7 (16)	11.5 (11)	46.9 (45)
	>30, n = 180	0	10.6 (19)	3.3 (6)	7.2 (13)	0	33.3 (60)	6.7 (12)	16.1 (29)	10.6 (19)	56.1 (101)
diabetes duration	<6 months, n = 107	0	11.2 (12)	3.7 (4)	6.5 (7)	0.9 (1)	42.0 (45)	9.3 (10)	16.8 (18)	15.9 (17)	46.7 (50)
	6 months – 1 year, n = 63	0	19.0 (12)	4.8 (3)	14.3 (9)	0	23.8 (15)	3.2 (2)	14.3 (9)	6.3 (4)	57.1 (36)
	>1 year, n = 134	1.5 (2)	11.2 (15)	3.7 (5)	6.7 (9)	0.75 (1)	36.6 (49)	8.2 (11)	17.9 (24)	10.4 (14)	50.7 (68)

a only the patients for whom data on all treatment goals were available

How to read the table: see **TABLE 4A**

Abbreviations: see **TABLES 1** and **4A**

a tendency for less stringent glucose control targets, reflecting the anxiety raised by the first results of the ACCORD trial (Action to Control Cardiovascular Risk in Diabetes), published in 2008, which showed increased cardiovascular mortality in intensive diabetes treatment group.[10-12] Further analysis of the ACCORD results revealed a higher mortality rate in those patients treated intensively who were not able to reach treatment goals.[13] We believe that future diabetes treatment goals will be individualized to some extent, depending on the risk-to-benefit ratio assumed. With DM2 being diagnosed at an earlier age and with longer life expectancy than 20 or 30 years ago, there should be increased awareness of disease burden that the treatment could modify.[14] Even though many glucose-lowering treatment options exist, most patients with newly diagnosed DM2 are not meeting their treatment goals, similarly to those with longer-lasting DM2, which was demonstrated in other countries.[15-17] Many factors may possibly play a role, but in diabetes care the most important are the adequate choice and doses of medications prescribed and patients' involvement in the process of care. We have no direct information from patients, and it was not possible to assess their satisfaction or level of anxiety associated with the disease. The fact that the proportion of patients with HbA_{1c} below 6.5% was significantly higher in the subgroup on metformin alone than in the subgroups on other oral agents or combinations of oral agents possibly reflects progression of the disease and/or conservative dosing of medications. The fact that substantial proportion of overweight or obese people do not use metformin reflects, in our opinion, underuse of that drug, which is supported by our finding that only a small proportion of patients do not receive metformin due to contraindications or side effects. Overall, glucose-lowering medication titration might have been insufficiently target-driven, with either medication choice or dosage being inadequate to maintain HbA_{1c} below 6.5%. The fact that high percentage of patients with DM2 of short duration have inadequately controlled disease (HbA_{1c} above the level indicated in the guidelines or above 7%) requires more attention. The results indicate either inadequate adherence to national clinical practice guideline recommendations, or that those DP 2008 guidelines might have been difficult to follow.[5] It is clear that the targets are not reached, but it cannot be excluded that physicians indeed follow the guidelines; thus, it is the guidelines that might be ineffective, and as such they may require revision towards greater efficacy of the recommended treatment procedures. Patients with recently diagnosed DM2 are more likely to benefit from an intensive treatment than those with long-lasting disease,[4,10,18] so attention is needed to provide optimal care at this stage of the disease using available treatment options. It was noted that 97 patients were treated with insulin (**TABLE 3**), which generally seems unusual for DM2 within the first

TABLE 4D Meeting treatment goals in patients with newly diagnosed diabetes participating in the ARATAEUS1 study; results for women (n = 382[a]), % (n)

Characteristics	Number of patients in the subgroups[a]	3 treatment goals	Only 2 treatment goals (excludes patients from the previous column who met all 3 goals)				Only 1 treatment goal (excludes patients from the previous columns who met more than 1 goal)				0 treatment goals
		HbA_{1c}, BP, LDL	any	HbA_{1c} and BP	HbA_{1c} and LDL	BP and LDL	any	BP	HbA_{1c}	LDL	HbA_{1c}, BP, LDL, all the above recommended levels
age	<40, n = 8	0	25.0 (2)	0	0	25.0 (2)	50.0 (4)	12.5 (1)	25.0 (2)	12.5 (1)	25.0 (2)
	≥40, n = 305[b]	2.3 (7)	12.1 (37)	3.3 (10)	6.9 (21)	2.0 (6)	34.1 (104)	6.2 (19)	18.7 (57)	9.2 (28)	51.5 (157)
BMI	<25, n = 31	0	29.0 (9)	0	19.4 (6)	9.7 (3)	41.9 (13)	12.9 (4)	19.4 (6)	9.7 (3)	29.0 (9)
	25–30, n = 122	2.5 (3)	13.9 (17)	6.6. (8)	6.6 (8)	0.8 (1)	28.7 (35)	6.6 (8)	14.8 (18)	7.4 (9)	54.9 (67)
	>30, n = 156[b]	2.6 (4)	8.3 (13)	1.3 (2)	4.5 (7)	2.6 (4)	35.9 (56)	4.5 (7)	21.2 (33)	10.3 (16)	53.2 (83)
diabetes duration	<6 months, n = 100	5.0 (5)	10.0 (10)	2.0 (2)	5.0 (5)	3.0 (3)	23.0 (23)	4.0 (4)	13.0 (13)	6.0 (6)	62.0 (62)
	6 months – 1 y, n = 72	1.4 (1)	8.3 (6)	2.8 (2)	4.2 (3)	1.4 (1)	40.3 (29)	5.6 (4)	22.2 (16)	12.5 (9)	50.0 (36)
	>1 year, n = 139	0.7 (1)	15.8 (22)	4.3 (6)	8.6 (12)	2.9 (4)	40.3 (56)	8.6 (12)	21.6 (30)	10.1 (14)	43.2 (60)

a only the patients for whom data on all treatment goals were available
b significant difference between the 2 groups (i.e., <40 and ≥40)

How to read the table: see **TABLE 4A**

Abbreviations: see **TABLES 1** and **4A**

2 years from diagnosis, and possibly we cannot exclude that some of those patients might have presented with latent autoimmune diabetes in adults, misclassified as DM2. Another issue is the time from the disease onset to the actual diagnosis that is unknown, but the presence of microvascular diabetes complications in some of the patients indicates that screening for the disease complications even in patients with DM2 of short duration is needed. Another possibility to diagnose those complications at milder stages or to delay their onset is to recommend a population screening program to diagnose DM2 at earlier stages, especially in patients with any other cardiovascular risk factors (obesity, hypertension, or dyslipidemia), but the benefits of such intervention are not clear. It is clear, however, that efforts should be made to increase practitioners' and patients' awareness of the fact that successful treatment of newly diagnosed and early DM2 may have long-lasting benefits ("legacy effect").[4] Diabetes at this stage may be difficult to control and requires significant efforts to reach and maintain treatment targets.

Contributors All of the authors contributed to the study concept, design, and implementation, and to the content and development of this report.

The ARETAEUS Study Group Scientific Committee Jacek Sieradzki, MD, PhD (Chair, Department of Metabolic Diseases, Jagiellonian University Medical College, Kraków, Poland), Waldemar Banasiak MD, PhD (Heart Disease Centre, Military Clinical Hospital, Wroclaw, Poland), Maria Górska, MD, PhD (Department of Endocrinology, Diabetology and Internal Medicine, Medical University of Bialystok, Bialystok, Poland), Władysław Grzeszczak MD, PhD (Department of Internal Medicine, Diabetology and Nephrology, Medical University of Silesia, Zabrze, Poland), Maciej Małecki, MD, PhD (Department of Metabolic Diseases, Jagiellonian University Medical College, Krakow, Poland), Bogna Wierusz-Wysocka, MD, PhD (Department of Internal Medicine and Diabetology, Poznań University of Medical Sciences).

Writing Group M.M. Bała, E. Płaczkiewicz-Jankowska, R. Topór-Mądry, W. Leśniak, R. Jaeschke, J. Sieradzki, W. Grzeszczak, W. Banasiak.

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Czy chorzy ze świeżo rozpoznaną cukrzycą typu 2 są leczeni zgodnie z wytycznymi?

Wyniki polskiego badania ARETAEUS1

Małgorzata M. Bała[1,2], Ewa Płaczkiewicz-Jankowska[1], Roman Topór-Mądry[3,4], Wiktoria Leśniak[1,2], Roman Jaeschke[5], Jacek Sieradzki[6], Władysław Grzeszczak[7], Waldemar Banasiak[8]; Grupa Badawcza ARETAEUS

1 Polski Instytut Evidence Based Medicine, Kraków
2 II Katedra Chorób Wewnętrznych, Uniwersytet Jagielloński, Collegium Medicum, Kraków
3 IBMed, Instytut Badań Medycznych, Kraków
4 Instytut Zdrowia Publicznego, Uniwersytet Jagielloński, Collegium Medicum, Kraków
5 McMaster University, Hamilton, Kanada
6 Katedra Chorób Metabolicznych, Uniwersytet Jagielloński, Collegium Medicum, Kraków
7 Katedra Chorób Wewnętrznych, Diabetologii i Nefrologii, Śląski Uniwersytet Medyczny, Zabrze
8 Klinika Kardiologii, Ośrodek Chorób Serca, Wojskowy Szpital Kliniczny, Wrocław

SŁOWA KLUCZOWE

badanie przekrojowe, cukrzyca typu 2, kontrola cukrzycy, wytyczne praktyki klinicznej

Adres do korespondencji:
Małgorzata M. Bała, MD, PhD, II Katedra Chorób Wewnętrznych, Uniwersytet Jagielloński, Collegium Medicum, ul. Skawińska 8, 31-066 Kraków, Poland,
phone: +48-12-29-34-236,
fax: +48-12-29-34-030,
e-mail: gosiabala@mp.pl
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STRESZCZENIE

WPROWADZENIE Nie ma danych na temat spełniania kryteriów kontroli choroby ze świeżo rozpoznaną cukrzycą typu 2 (t2).

CELE Badanie przeprowadzono w celu scharakteryzowania chorych ze świeżo rozpoznaną cukrzycą t2 w Polsce, oceny leczenia hiperglikemii i określenia odsetka chorych spełniających kryteria kontroli cukrzycy zalecane w polskich wytycznych praktyki klinicznej z 2008 roku.

PACJENCI I METODY Badanie ARETAEUS1 było przekrojowym badaniem kwestionariuszowym przeprowadzonym w wielu regionach Polski w 2009 roku (styczeń–kwiecień). Badaniem objęto 1714 chorych na cukrzycę t2 w każdym wieku i obu płci leczonych przez <24 miesiące, włączonych do badania przez losowo wybranych lekarzy.

WYNIKI Jedynie 28,9% chorych na cukrzycę t2 spełniło kryterium kontroli HbA_{1c} (<6,5%). W całej populacji jedynie 1,4% chorych spełniło wszystkie kryteria kontroli choroby (HbA_{1c}, ciśnienie tętnicze i profil lipidowy), 12,5% – dwa z tych kryteriów, 35,3% – jedno z tych kryteriów, a 50,7% chorych nie spełniło żadnego z tych kryteriów. Częstość spełnienia wszystkich kryteriów kontroli cukrzycy w podgrupach chorych (m.in. wyodrębnionych ze względu na obecne leczenie cukrzycy, wiek, płeć wskaźnik masy ciała, czas trwania cukrzycy) była zróżnicowana.

WNIOSKI Większość chorych ze świeżo rozpoznaną cukrzycą t2 nie spełnia wszystkich kryteriów kontroli cukrzycy, co wskazuje na stosunkowo małą częstość przestrzegania polskich zaleceń klinicznych dotyczących kontroli cukrzycy i pierwotnej profilaktyki sercowo-naczyniowej w cukrzycy t2. Wydaje się, że zbyt rzadko stosuje się metforminę, a dawkowania pozostałych leków hipoglikemizujących być może nie dostosowuje się dostatecznie do celu leczenia. Zakładając, że przestrzeganie aktualnych zaleceń praktyki klinicznej jest korzystne dla chorych, zalecamy zwiększenie świadomości lekarzy i pacjentów co do aktualnych wytycznych i sposobów osiągania i utrzymania celów leczenia.