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Clinical profile of a patient after myocardial infarction and acute cerebrovascular accident based on outpatient register data

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Abstract

The article presents the results of the analysis of outpatient register data of patients after myocardial infarction (MI) and acute cerebrovascular accident (ACVA). Based on the epidemiological characteristics of individuals included in the register, a clinical "portrait of a patient" after an acute cardiovascular event was formed. The features of clinical and laboratory parameters, as well as behavioral and metabolic factors of cardiovascular risk in patients included in the study were determined; and adherence to treatment before and after the reference event was assessed over a 12-year follow-up period.

The objective of the study: to determine the features of clinical and epidemiological characteristics and parameters of laboratory and instrumental studies, the profile of cardiovascular risk factors in patients with a history of MI and ACVA, and to establish their adherence to treatment before and after the reference event over a 12-year follow-up period.

Materials and methods. We analyzed the data of 410 patients who applied to an outpatient and polyclinic healthcare organization between January 1, 2019, and December 31, 2022, with confirmed acute (recurrent) myocardial infarction and/or cerebral infarction that occurred between January 1, 2010, and December 31, 2019. Patients were included in the register after establishing their vital status as of January 1, 2020. The data of records and reports from healthcare organizations (forms 025/u, 131-u) and electronic outpatient records of medical information systems (MIS) from outpatient polyclinic institutions (OPI) were used. The results of the retrospective stage analysis of the study and the electronic patient database from the information and analytical system "Register of MI/ACVA" were presented. Standard methods of descriptive and analytical statistics, statistical software packages (SPSS, SAS, STATISTIKA 10, Stata) and programming languages (R, Python) were used.

Results. Lipid metabolism disorders were identified in 36.8% (n=151) of the patients included in the register. It was noted that lipid-lowering therapy was prescribed to 21.7% (n=89) of the patients included in the study. The lowest rate of this therapy was found in the ACVA group – 7.9% (n=18). In patients who had both MI and ACVA (ACVA+MI group), it was 45% (n=9). Among MI patients (MI group), lipid-lowering therapy was prescribed in 38.5% (n=6) of cases.

Target blood pressure (BP) levels were not achieved in 81.7% (n=335) of patients in all three study groups, which was confirmed by registration of elevated BP levels exceeding 139/89 mm Hg during medical examinations, most frequently observed in the ACVA group.

The comorbid background, which allowed to classify the register patients as extremely high cardiovascular risk individuals, was characterized by type 2 diabetes mellitus (DM) in one-third of cases (n=127).

The insufficient level of adherence to medical recommendations for modifying major cardiovascular risk factors was established: the percentage of individuals who reduced excess weight was 2.4% (n=10), quit smoking – 1.9% (n=8), achieved target lipid profile values – 3.4% (n=14), adjusted nutrition– 0.2% (n=1), and increased physical activity – 0.2% (n=1). However, notes regarding the issuance of recommendations were present in the medical records for most patients – in 95.6% (n=392) of cases. The highest level of adherence to recommended measures was observed concerning hypertension treatment – 88.5% (n=363).

Conclusion. The features of clinical and epidemiological, and laboratory characteristics, as well as the prevalence of cardiovascular risk factors such as smoking, alcohol abuse, arterial hypertension, dyslipidemia, obesity, and diabetes mellitus, were established in patients with a history of myocardial infarction and acute cerebrovascular accident. The adherence of this category of patients to treatment was assessed over a 12-year period before and after the reference event. Based on the outpatient register data, a clinical "portrait of a patient" after myocardial infarction and acute cerebrovascular accident was formed.

Key words: registers, myocardial infarction, acute cerebrovascular accident, quality of medical care, outpatient and polyclinic institutions.

The establishment of an outpatient register of patients with a history of myocardial infarction (MI) and acute cerebrovascular accident (ACVA) of any remoteness has become the first step in systematizing clinical and epidemiological studies in cardiology in the Republic of Belarus. Its relevance is determined by the necessity to enhance the effectiveness of medical prevention of socially significant and clinically costly complications of cardiovascular diseases (CVD), as well as the search for ways to improve the quality of primary and specialized medical care for cardiac patients. The scientific component of this study is based on the analysis of data on patients with high cardiovascular risk accumulated using information and computer technologies and the application of the mathematical modeling methods to determine strategic directions of organizational activities in healthcare. The chosen direction of creating and using the results of the study of the outpatient register data of patients with a history of MI and ACVA of any remoteness is particularly relevant given that, in the Republic of Belarus, in 2019, at the time of publication of the latest official statistics, 1,480 people died from MI, ten times more from ACVA - 13,232 patients. The incidence of recurrent ACVA was twice as high as that of recurrent myocardial infarction. The key organizational aspect in working with this category of patients is the comprehensive assessment of prognostically significant risk factors for the development of adverse outcomes and comorbidity indices in patients with a history of acute cardiovascular catastrophes, which allows the created outpatient register to be made. This function distinguishes the register favorably from other information

technologies such as registries, databases, and randomized clinical trials, which are considered the "gold standard" of evidence-based medicine in the development of clinical guidelines.

According to international registers, during the outpatient-polyclinic stage of medical care among patients with a history of MI and/or cerebral stroke (CS), in 65-75% of cases, the time since the initial acute event at the moment of patient inclusion in the study was over one year, and in 55-65% of cases, it was over two years. The proportion of deaths among individuals who had both events was 20%. Non-fatal recurrent cardiovascular complications in individuals with a history of MI were 4%, while it was 2.4% for those with a history of CS. In patient after CS, acute myocardial infarction (AMI) developed in 1.2% of cases, and the incidence of recurrent CS in this group was 9.2%. In individuals with a history of MI and CS, recurrent CS occurred in 8.2% of cases, while recurrent myocardial infarction occurred in 4.2%. The annual mortality rate in the MI group was 4.1%, in the CS group it was 8.2%, and in the MI+CS group it was 12.2% [1,2].

High morbidity and mortality rates from diseases of the circulatory system (DCS) represent an unresolved issue in modern healthcare [3]. In 2023, the primary incidence of DCS in the Republic of Belarus amounted to 342 thousand cases or 3,731 cases per 100 thousand population [4]. According to the National Statistical Committee, in 2019, 120,470 people died in the Republic of Belarus from all causes, including 23,375 of working age, with 71,017 deaths attributed to DCS (59.0% of the total mortality structure). The cardiovascular mortality rate in Belarus in 2019 was 754.1 per 100 thousand population [5]. Myocardial infarction and acute cerebrovascular accidents, which combines ischemic or cardioembolic cerebral infarction as well as hemorrhagic stroke [6,7], occupy leading positions in the causes of mortality and disability in the population. Half of the patients after ACVA have limitations in life activities [8], necessitating additional measures aimed at minimizing the negative impact of this complication on public health indicators. Prognostic data published in the scientific literature suggest an increase in mortality from DCS worldwide. This is attributed to an increase in average life expectancy, the proportion of elderly individuals in the population structure, and an increase in the prevalence of cardiovascular risk factors [9-11]. As a result, a twofold increase in expenditures for medical prevention, diagnosis, and treatment of CVD is expected, along with a 60% increase in indirect costs due to low labor productivity [12,13]. Since 2006, comprehensive measures have been implemented within demographic security programs in the Republic of Belarus aimed at creating conditions for improving public health, actively detecting diseases, timely treatment, and reducing mortality in the working-age population [14-16].

According to the World Health Organization, there has been a consistent increase in the total number of ACVA and related fatalities over the past 20 years [7].

Observations have revealed that mortality from ACVA exceeds that of MI [17]. The effective quality control of medical care, which facilitates rational allocation of available resources for secondary medical prevention of MI and ACVA [9], is possible through epidemiological studies [18].

The enhancement of effectiveness of medical monitoring for patient groups at high cardiovascular risk, as identified in the register, will contribute to the improvement of medical, demographic, and socioeconomic indicators in the country.

The objective of the study is to determine the features of clinical and epidemiological characteristics and parameters of laboratory and instrumental studies, the profile of cardiovascular risk factors in patients with a history of MI and ACVA, and to establish their adherence to treatment before and after the reference event over a 12-year follow-up period.

Materials and Methods

The inclusion criteria: history of MI and/or ACVA of any remoteness; visit to the outpatient clinic for any reason during the period from January 1, 2019, to December 31, 2022; age 18 years or older; the presence of informed consent for the processing of personal data in the outpatient medical record; and permanent residence in the city where the register is being established.

The exclusion criteria: non-compliance with the inclusion criteria.

The date of inclusion in the register corresponded to the date of the reference visit to the outpatient clinic (the initial visit during the inclusion period from January 1, 2019 to December 31, 2022). The duration of the follow-up period was 24 months or more. The list of patients for inclusion in the register in accordance with the above criteria was compiled based on information from electronic databases regarding those who visited the outpatient clinic during the specified period. To ensure the objectivity of this list, the fact of visiting the outpatient clinic of patients with a history of MI and/or ACVA in the corresponding calendar year and previously included in the annual lists starting from 2010 was verified during the inclusion period. The data of records and reports from healthcare organizations (forms 025/u, 131-u), electronic outpatient records of the MIS OPI, electronic databases of patients included in the IAS "Register of MI/ACVA", and the results of the retrospective stage of the study were used. All information regarding patients included in the register was exported from their outpatient medical record and official electronic databases into the developed form "Patient card included in the register." This card fully presented the main demographic and anthropometric indicators (age, sex, education, height, weight, etc.), medical history data, primary disease risk factors, cardiovascular and comorbid conditions, baseline data on clinical examination and treatment conducted at the outpatient stage, information on visits to doctors in OPI, ambulance calls, and hospitalizations. The information regarding patients was retrieved from the database and exported in EXCEL format based on the following parameters:

clinical and epidemiological (sex, age, education, presence or absence of disability group, hereditary history, past acute cardiovascular events, presence of comorbid pathology, and medical examination);

clinical and laboratory (serum blood glucose levels, total cholesterol, high-density lipoproteins (HDL), low-density lipoproteins (LDL), triglycerides (TG), blood pressure, BMI);

presence of risk factors (smoking, alcohol abuse, physical inactivity, and unhealthy diet).

Statistical software packages (SPSS, SAS, STATISTIKA 10, Stata) with standard methods of descriptive and analytical statistics, programming languages (R, Python), and mathematical modeling methods were used. Quantitative indicators were presented as arithmetic mean ± standard deviation (M ± σ). Qualitative variables were described with their absolute values and proportions expressed as n (%).

At this stage of the study, the sex-age structure of patients, the prevalence of the main cardiovascular risk factors, clinical laboratory and instrumental research indicators, analysis of information on visits to a cardiologist and general practitioner, hospitalizations, ambulance calls, and medical examinations of patients included in the study were taken into account.

Results and Discussion.

1. General epidemiological characteristics of patients included in the register

Data of 410 patients from two pilot outpatient clinics included in the register, who had one or more adverse acute cardiovascular events (ACVA, MI) registered in the period from 2010 to 2019, were analyzed. Among them, 229 (55.9%) patients had ACVA, 161 (39.3%) had MI, and 20 (4.9%) had both ACVA and MI. The register data enabled us to determine some social characteristics of the studied individuals (Table 1).

Table 1. – Educational background of patients in the study groups, (%)

Education	Total %, (n = 342)	ACVA %, (n = 178)	MI %, (n = 146)	ACVA+MI %, (n = 18)
Higher	19,9 (68)	14,0 (25)	24,0 (35)	44,4 (8)
Secondary	24,6 (84)	29,2 (52)	20,5 (30)	11,1 (2)
Vocational secondary	53,2 (182)	55,1 (98)	52,1 (76)	44,4 (8)
Academic degree	0,6 (2)	0,6 (1)	0,7 (1)	0,0 (0)
Incomplete vocational	0,9 (3)	1,1 (2)	0,7 (1)	0,0 (0)

The indicators were calculated in all patient groups, except those marked as "no data" (n = 68). The highest incidence of adverse cardiovascular events was registered in patients with secondary and vocational secondary specialized education, at rates of 24.6% and 53.2%, respectively. In patients with higher education, acute events occurred in 19.9% of cases. Myocardial infarction was most frequently observed in this category (24.0%), while acute cerebrovascular accidents were more prevalent in patients with secondary and vocational secondary specialized education (29.2% and 55.1%, respectively, versus 14.0% in patients with higher education). Data on disability due to CVD were distributed as follows (Table 2).

Table 2. – Prevalence of disability in the study groups, (%)

Characteristic	Total %, (n = 410)	ACVA %, (n = 229)	MI %, (n = 161)	ACVA+MI %, (n = 20)
Disability	62,4 (256)	66,4 (152)	54, 0 (87)	85,0 (17)
No data	0,5 (2)	0,3 (1)	1,2 (2)	5,0 (1)

In total, 256 individuals (62%) were disabled. The highest disability rate was observed in the ACVA+MI group – 85%, while the largest group of disabled individuals consisted of patients with a history of ACVA – 152 individuals (66.4%). People without an established disability group made up 38%.

When analyzing the structure of ACVA in patients included in the register, a predominance of unspecified forms of this pathology was identified, indicating low statistical recording informativeness – 64.2% of individuals had no indication of the ACVA type in the medical documentation. Indicators were calculated for all study groups except cases marked as "no data" and "unspecified" (n = 150 and n = 3, respectively). The highest proportion of patients with ischemic MI (78.0%) was registered, significantly exceeding the number of individuals with hemorrhagic stroke (22.0%). When combined with myocardial infarction, ischemic stroke was more frequently registered – 85.7% (Table 3).

Table 3. Structure of ACVA in the study groups, (%)

Tupe of ACVA	ACVA (n = 82)	ACVA+MI (n = 14)
Ischemic	78,0 (64)	85,7 (12)
Hemorrhagic	22 (18)	14,3 (2)

Among the patients included in the register, the incidence of acute MI in the MI and MI+ACVA groups was 83.9% and 95.0%, respectively. A recurrent coronary event

was identified in a higher percentage of cases in patients with a history of MI—16.1%. In the ACVA group, a recurrent MI developed in one (5%) patient (Table 4).

Table 4. – Distribution of patients in the study groups by type of previous MI, (%)

Type of MI	MI %, (n = 161)	ACVA+MI %, (n = 20)
Acute	83,9 (135)	95 (19)
Recurrent	16,1 (26)	1 (5)

2. Prevalence of the main cardiovascular risk factors, analysis of clinical, laboratory and instrumental study indicators.

It was established that patients after ACVA were more likely to have a family history compared to the MI group (25.3% versus 19.9%). Adverse cardiovascular events occurred more often in men (55.6%) than in women in all study groups. The highest proportion of men was observed in both MI and ACVA groups – 64.0% and 50.2%, respectively. In the ACVA+MI group, the number of men and women was equal: 10 individuals (50%) in each category.

The average age of patients included in the study was 68.6 ± 10.7 years. Patients with a history of MI were predominantly men aged 64.1 ± 11.8 years, with a mean age of 63.3 ± 9.5 years. The average age of women in this group was 71.9 ± 11.2 years. Patients with a history of ACVA had an mean age of 66.9 ± 9.5 years (men: 65.64 ± 10.69 years, women: 73.19 ± 5.63 years). The average age in the ACVA+MI group was 69.5 ± 10.0 years (Table 5, Figure 1).

Table 5. – Characteristics of the main non-modifiable risk factors in the study groups

Characteristic	Total %, (n = 410)	ACVA %, (n = 229)	MI %, (n = 161)	ACVA+ MI %, (n = 20)
Women	44,5 (182)	49,8 (114)	36,0 (58)	50,0 (10)
Men	55,6 (228)	50,2 (115)	64,0 (103)	50,0 (10)
Age, years	68,59 ± 10,7	66,9 ± 9,5	63,3 ± 9,5	69,5 ± 10,0
Family History	22,7 (93)	25,3 (58)	19,9 (32)	15,0 (3)

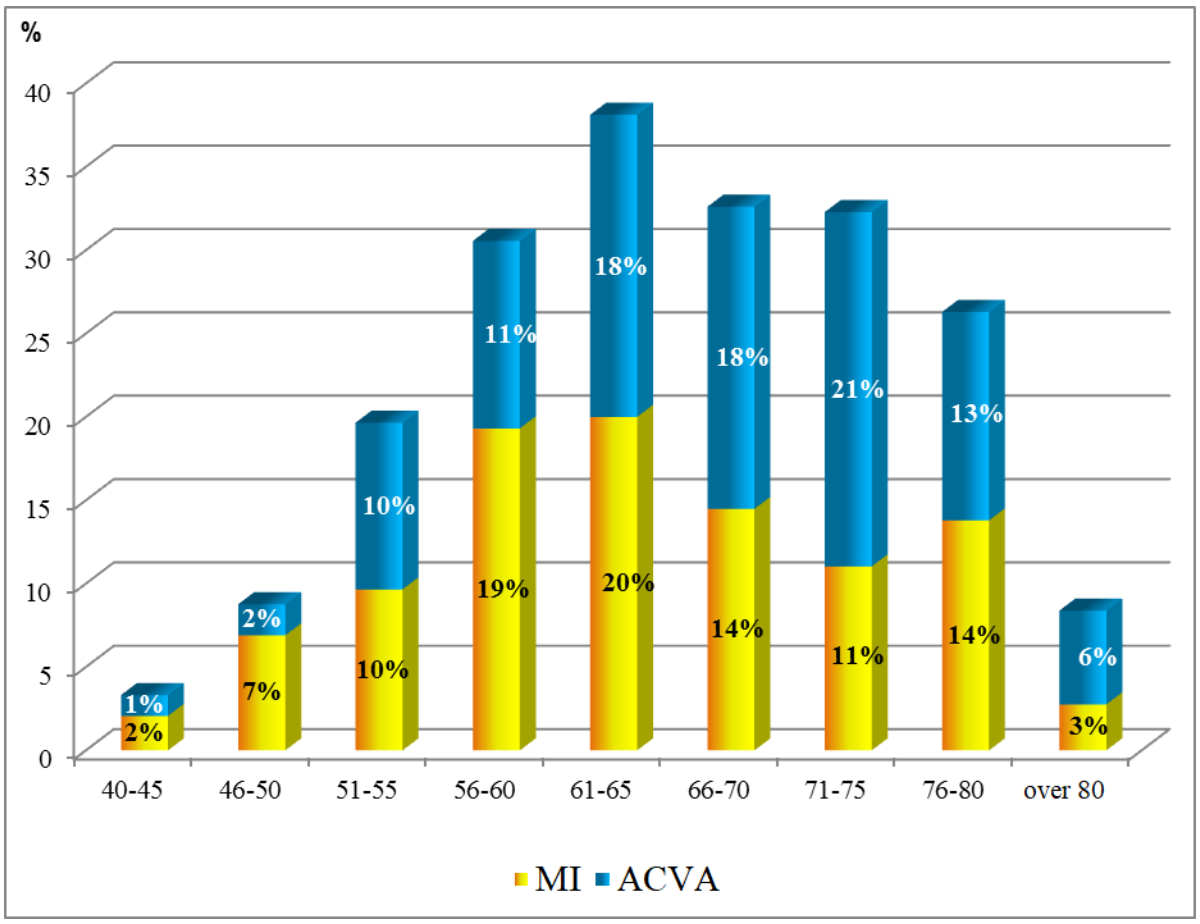


Figure 1. Age distribution of patients in the study groups.

The highest incidence of ACVA was identified in the 71–75 age group, while MI was most prevalent in the 61–65 age group. At the same time, there was an increase in the number of adverse cardiovascular events in both groups starting at age 51. After age 65, there was a decrease in MI cases and an increase in ACVA cases.

Table 6 contains data on the frequency of modifiable risk factors for CVD in the three study groups.

Table 6. – Frequency of the main modifiable risk factors in the study groups, (%)

Indicator	Total %, (n = 410)	ACVA %, (n = 229)	MI %, (n = 161)	ACVA+MI %, (n = 20)
Smoker	7,6 (31)	5,2 (12)	11,8 (19)	0,0 (0)
Non-smoker	89,7 (368)	91,3 (209)	86,9 (140)	95,0 (19)
No smoking data	2,7 (11)	3,5 (8)	1,2 (2)	5,0 (1)
Alcohol abuse	5,4 (22)	1,3 (3)	10,6 (17)	10,0 (2)
Hypodynamia	0,2 (1)	0,4 (1)	0,0 (0)	0,0 (0)
Unhealthy diet	1,0 (4)	0,0 (0)	2,5 (4)	0,0 (0)
Presence of obesity	24,1 (99)	23,1 (53)	25,5 (41)	25,0 (5)
Class I obesity	11,5 (47)	10,5 (24)	13,0 (21)	10,0 (2)

Class II obesity	4,4 (18)	4,4 (10)	4,3 (7)	5,0 (1)
Class III obesity	3,4 (14)	3,1 (7)	3,1 (5)	10,0 (2)
Unspecified obesity	4,9 (20)	5,2 (12)	4,9 (8)	0,0 (0)
No obesity	75,8 (311)	76,8 (176)	74,5 (120)	75,0 (15)
Dyslipidemia	36,8 (151)	38,0 (87)	34,2 (55)	45,0 (9)
Presence of hypertension	97,3 (399)	98,7 (226)	95,0 (153)	100,0 (20)
Stage I hypertension	9,5 (39)	6,1 (14)	14,3 (23)	10,0 (2)
Stage II hypertension	72,0 (295)	71,6 (164)	72,7 (117)	70,0 (14)
Stage III hypertension	15,9 (65)	20,5 (47)	8,7 (14)	20,0 (4)
No data on hypertension	1,2 (5)	0,9 (2)	1,9 (3)	0,0 (0)
Episodes of increased BP above 139/89 mm Hg	81,7 (335)	88,6 (203)	72,7 (117)	75,0 (15)
Presence of DM	30,9 (127)	29,3 (67)	32,3 (52)	40,0 (8)
DM2	30,2 (124)	27,9 (64)	32,3 (52)	40,0 (8)
DM1	0,2 (1)	0,4 (1)	0,0 (0)	0,0 (0)
Unspecified DM	0,5 (2)	0,9 (2)	0,0 (0)	0,0 (0)

It was found that 89.7% (n=368) of the participants in the study groups were non-smokers. Furthermore, most of the non-smokers were identified in the group of patients with a history of ACVA – 91.3% (n=208). Among individuals with a history of MI, this indicator was 86.9% (n=140). Alcohol abuse was most frequently noted in the MI group – 10.6% (n=17) versus 1.3% (n=3) among patients after ACVA. No smokers were registered in the ACVA+MI group, and alcohol abuse was noted in 2 out of 20 patients (10%) in this group.

It was revealed that every fourth patient included in the register was overweight: class I obesity was more prevalent (11.5%, n=47), while a higher percentage of class III obesity was observed in the ACVA+MI group (10%, n=2).

The BMI in the study groups was 28.5 ± 4.5 kg/m²: 28.4 ± 5.0 kg/m² in the ACVA group, 29.2 ± 4.8 kg/m² in the MI group, and 31.6 ± 6.1 kg/m² in the ACVA+MI group. A quarter of the patients (n=99) included in the register had varying degrees of obesity, with the highest proportion in the MI+ACVA group (25.0%, n=5) and the MI

group (25.5%, n=41). Figure 2 shows the frequency of various BMI indicators in the study groups.

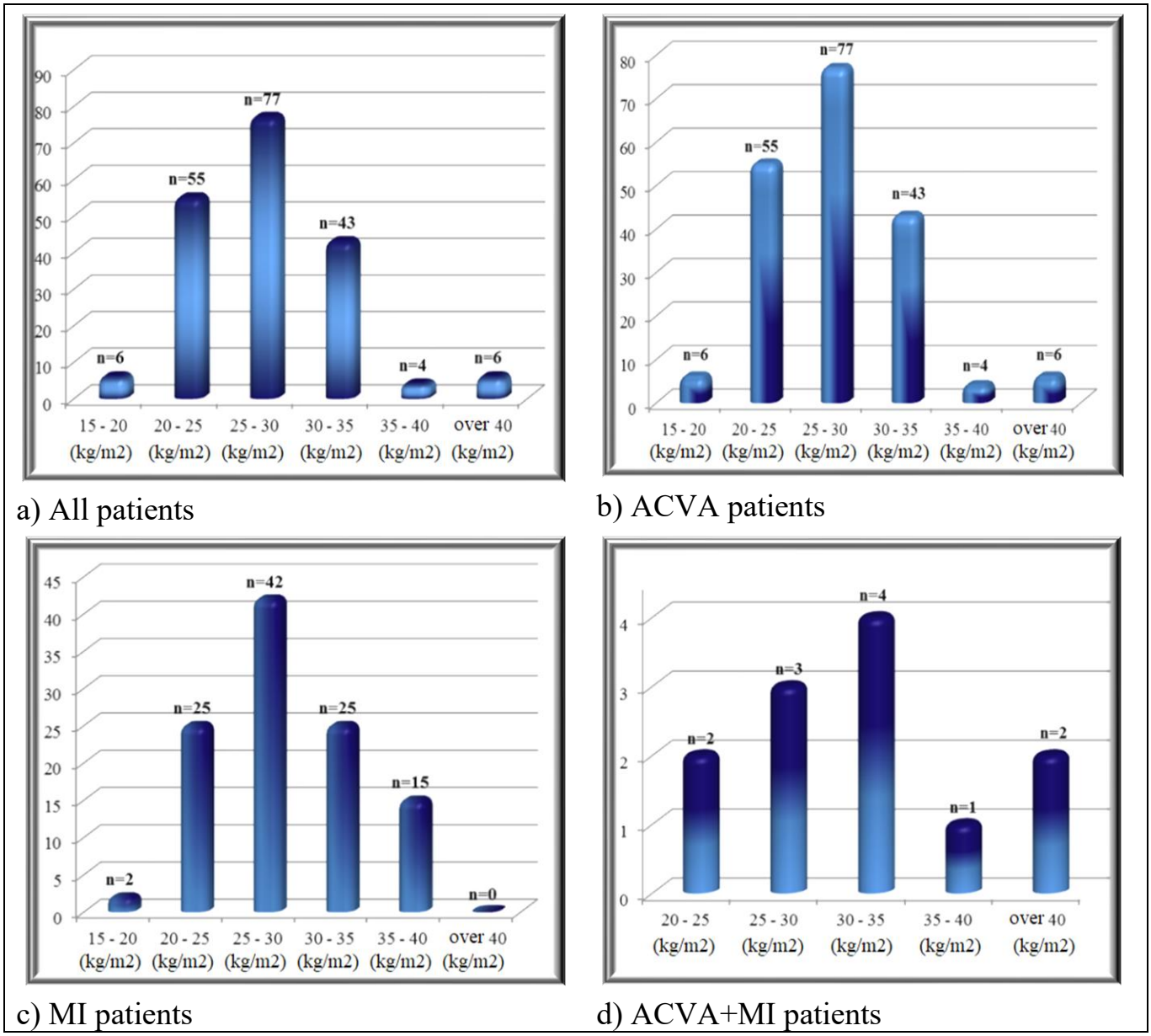


Figure 2. Frequency of various BMI indicators in the study groups.

Overweight (BMI 25.0–30.0 kg/m²) was most frequently identified among patients included in the outpatient register: 40.3% (n=77) in the ACVA group, 38.5% (n=42) in the MI group, and 25.0% (n=3) in the ACVA+MI group.

An analysis of elevated total cholesterol levels over the past 12 months was conducted in the study groups (Figure 3).

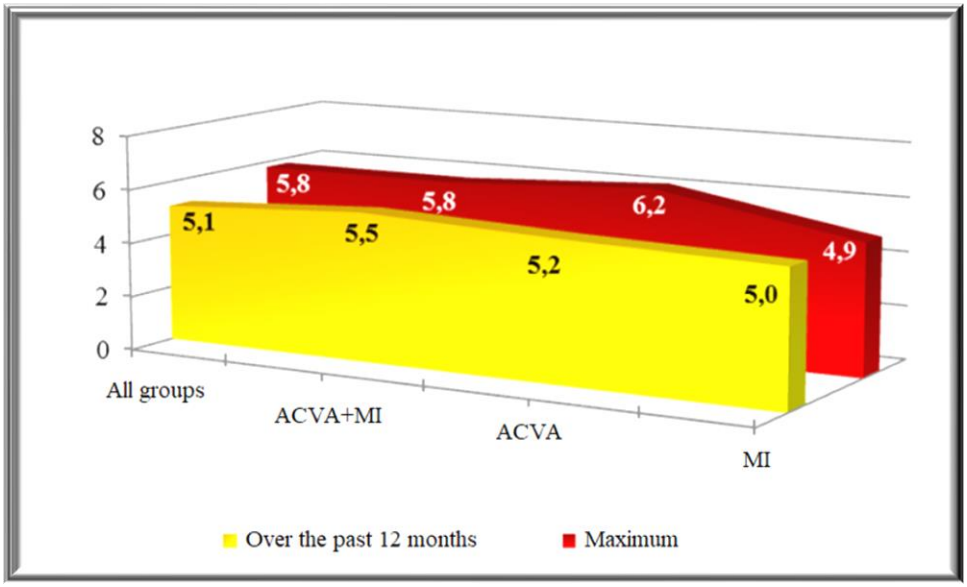
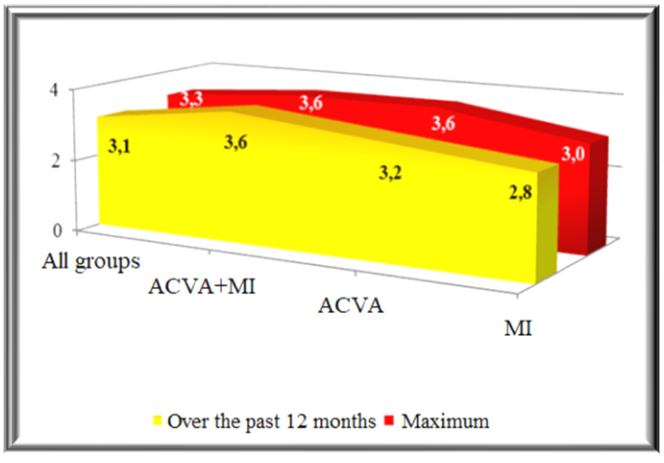
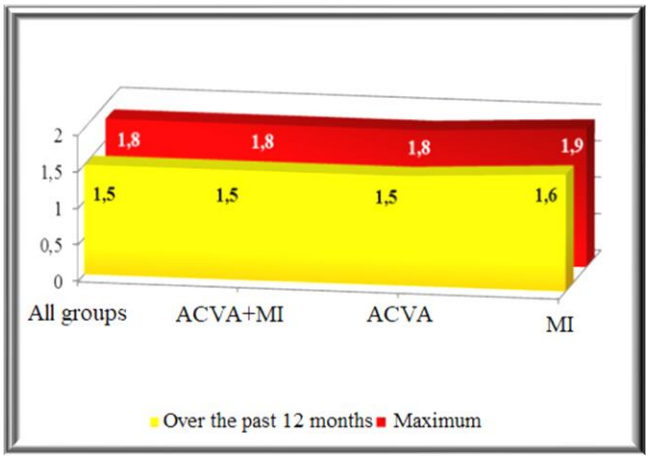


Figure 3. Dynamics of total cholesterol levels over the past 12 months in the study groups.

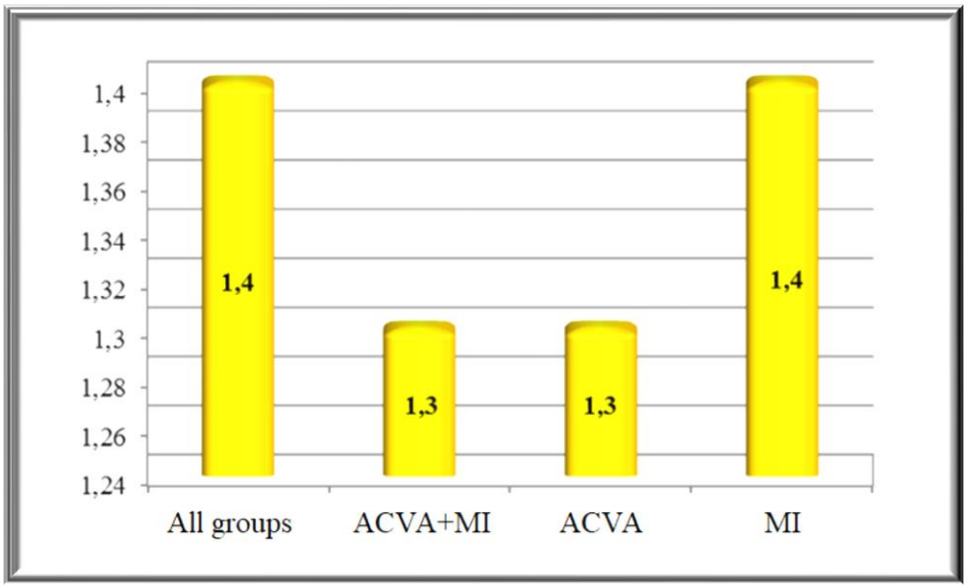
The maximum levels of total cholesterol in the study groups throughout the follow-up period in the OPI and over the last 12 months were 5.8 ± 1.5 mmol/L and 5.1 ± 1.4 mmol/L, respectively, 6.2 ± 1.4 and 5.2 ± 1.3 mmol/L in the ACVA group, respectively, 4.9 ± 1.3 and 5.0 ± 1.4 mmol/L in the MI group, respectively, and 5.8 ± 1.8 mmol/L and 5.5 ± 1.6 mmol/L in the ACVA+MI group, respectively. An unacceptably high level of this indicator was observed in all study groups, which did not correspond to the recommended target values for secondary prevention. Comparison of lipid profile indicators over the last 12 months relative to maximum values is presented in Figure 4.



a) Maximum LDL level and its dynamics over the past 12 months



b) Maximum Tg level and its dynamics over the past 12 months



c) HDL level in the study groups over the past 12 months

Figure 4. Lipid profile indicators in the study groups.

The maximum LDL level at the time of inclusion in the register and over the last 12 months in the study groups was 3.3 ± 1.2 mmol/L (n = 240) and 3.1 ± 1.1 mmol/L (n = 180), respectively, 3.6 ± 1.2 mmol/L (n = 152) and 3.2 ± 1.1 mmol/L (n = 108) in the ACVA group, respectively, 2.8 ± 1.0 mmol/L (n = 77) and 3.0 ± 1.1 mmol/L (n = 61) in the MI group, respectively, and 3.6 ± 1.5 mmol/L (n = 11) and 3.6 ± 1.3 mmol/L (n = 11) in the ACVA+MI group, respectively. The presented data indicate insufficient diagnostics for lipid metabolism disorders in patients included in the outpatient register and unsatisfactory achievement of target LDL levels.

The maximum TG level at the time of inclusion in the register and over the last 12 months in the study groups was 1.8 ± 1.0 mmol/L (n = 288) and 1.5 ± 0.7 mmol/L (n = 229), respectively, 1.8 ± 0.9 mmol/L (n = 193) and 1.5 ± 0.8 mmol/L (n = 156) in the ACVA group, respectively, 1.8 ± 1.2 mmol/L (n = 85) and 1.5 ± 0.7 mmol/L (n = 61) in the MI group, respectively, and 1.9 ± 1.1 mmol/L (n = 10) and 1.6 ± 0.6 mmol/L (n = 12) in the ACVA+MI group, respectively. A positive dynamic of decrease in this indicator was observed in all groups. However, there was an insufficient number of patients in whom TG levels were determined (n = 288).

The HDL level over the last 12 months in the study groups was 1.4 ± 0.4 mmol/L (n = 165), 1.3 ± 0.4 mmol/L (n = 100) in the ACVA group, 1.4 ± 0.4 mmol/L (n = 52) in the MI group, and 1.3 ± 0.3 mmol/L (n = 13) in the ACVA+MI group. There was an insufficient number of patients in whom HDL levels were determined (165 patients out of 410).

The frequency of different ranges of maximum total cholesterol levels is presented in Figure 5.

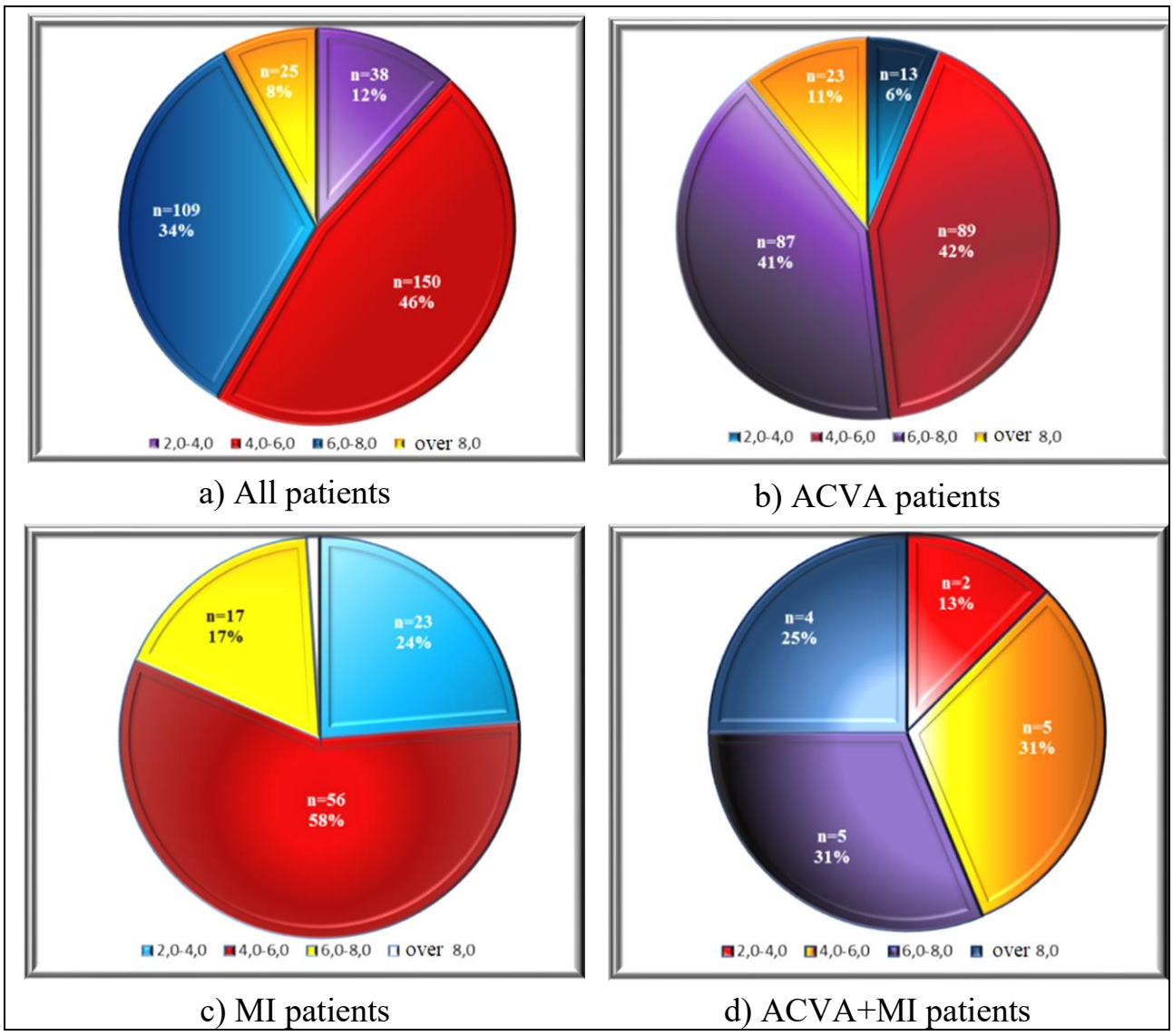


Figure 5. Frequency of different ranges of maximum total cholesterol levels in the study groups.

Total cholesterol levels in the range of 4.0–6.0 mmol/L were found in 42% (n = 89) of the ACVA group and 58% (n = 56) of the MI group.

Figure 6 shows the frequency of different ranges of maximum LDL levels in the study groups.

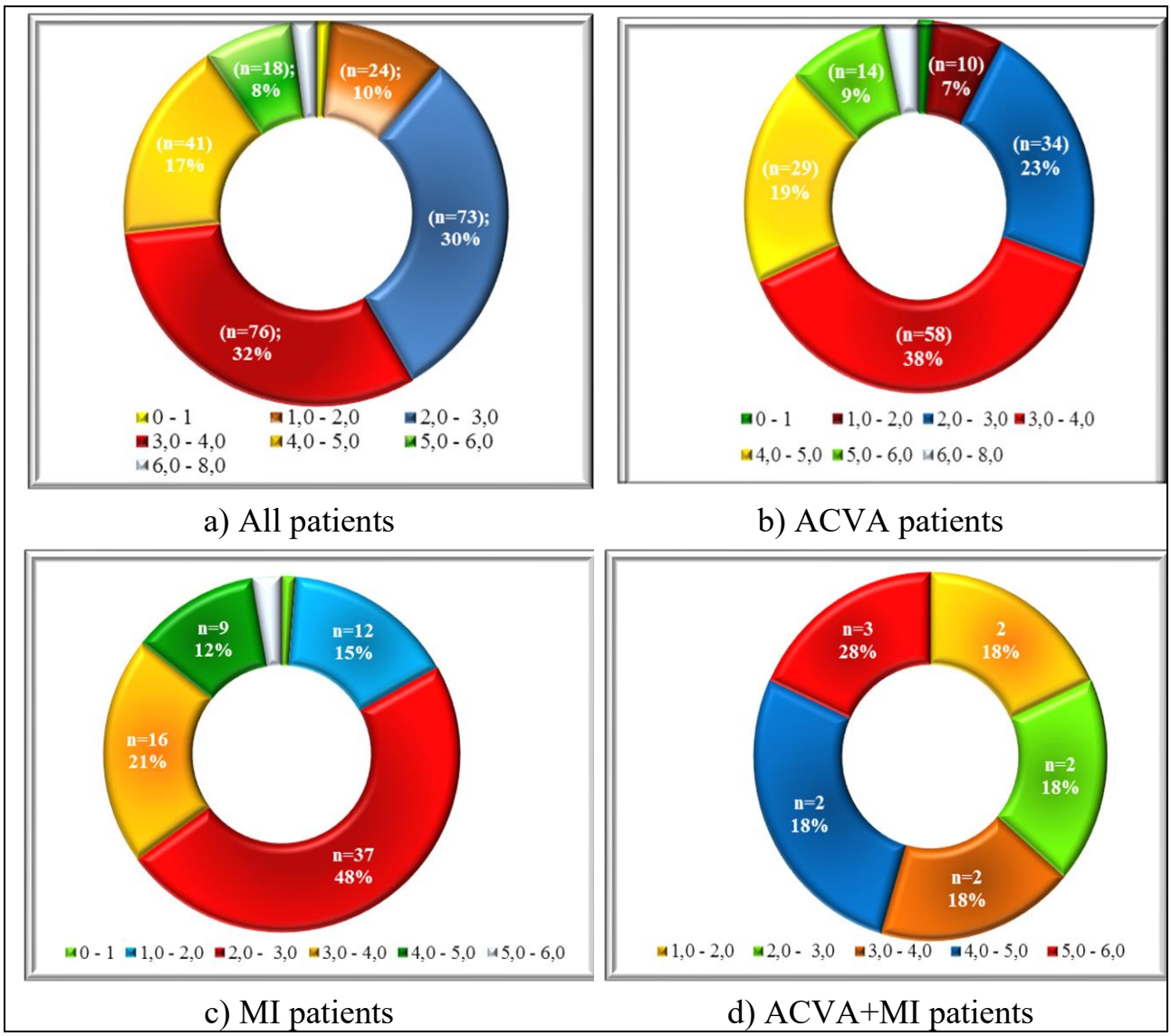


Figure 6. Frequency of different ranges of maximum LDL cholesterol levels in the study groups.

The most frequently observed LDL level in the ACVA group was 3.0 – 4.0 mmol/L; 38% (n = 58) of individuals had LDL levels in this range. In the MI group, this level was 2.0 – 3.0 mmol/L (48% (n=37) of those examined).

An insufficient rate of prescribing lipid-lowering therapy was noted in all study groups – 21.7% of patients (n=89): the lowest rate was in the ACVA group (7.9%, n=18). In the MI group, correction was performed in 38.5% of cases (n=62).

The incidence of hypertension was 97.3% (n=399) across all study groups. Stage II hypertension was the most frequently registered. Unsatisfactory achievement of target blood pressure was established in all three study groups, as evidenced by BP recording above 139/89 mmHg in 81.7% of cases (n=355), most frequently observed in ACVA patients (88.6%, n=203).

Analyzing the comorbid background related to risk factors, it was noted that DM2 was recorded in one-third of cases (n=124), while DM1 was recorded in a few cases (n=1) in patients included in the study.

In the ACVA group (n=63), the maximum glucose level was 10.5 ± 4.5 mmol/L. Over the past 12 months, glycemic levels were determined in only 2 patients (6.0 mmol/L and 7.0 mmol/L).

In the MI group (n=50), the maximum glucose level was 10.4 ± 4.5 mmol/L. Over the past 12 months, glycemic levels were determined in only 1 patient, who had a level of 6.0 mmol/L.

In the ACVA+MI group (n=8), the maximum glucose level was 9.7 ± 2.6 mmol/L. Over the past 12 months, glycemic levels were not determined in this patient group.

The frequency of different ranges of maximum glucose levels in the study groups is shown in Figure 7.

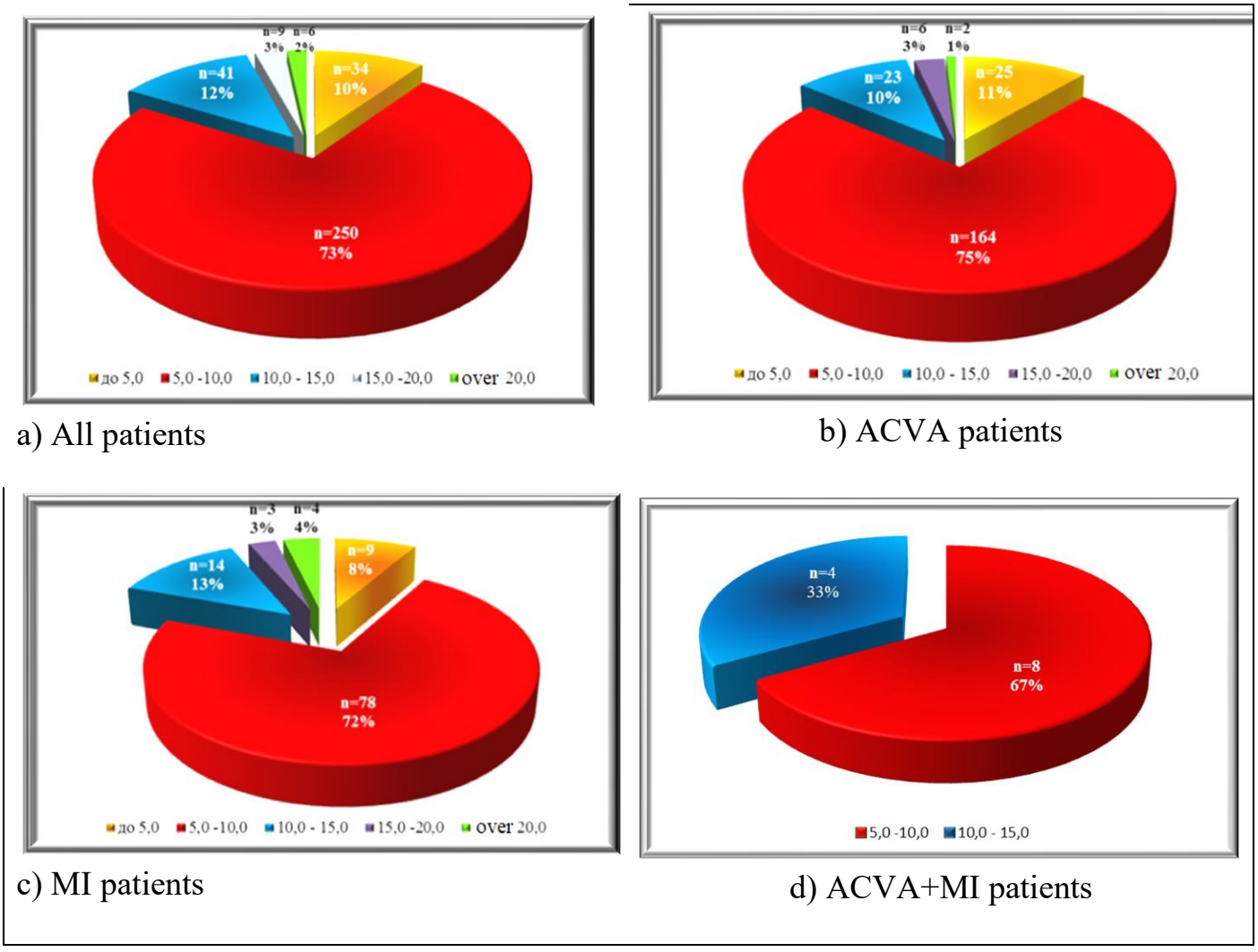


Figure 7. Frequency of different ranges of maximum glucose levels in the study groups.

Two-thirds of the examined patients (73%, n = 250) had elevated blood glucose levels in the range of 5.0–10.0 mmol/L. This level of glycemia was established in 75%

(n = 164) of the ACVA group, 72% (n = 78) of the MI group, and 67% (n=8) of the ACVA+MI group.

There was a low level of adherence to medical recommendations for modifying the main cardiovascular risk factors: the percentage of individuals who reduced excess weight was 2.4% (n=10), quit smoking – 1.9% (n=8), achieved target lipid profile values – 3.4% (n=14), adjusted their diet – 0.2% (n=1), and increased physical activity – 0.2% (n=1). The highest level of adherence to the recommended measures was observed in treatment of arterial hypertension – 88.5% (n=363). It cannot be ruled out that the recommendations for modifying risk factors were communicated verbally. Records of issuing recommendations were present in the medical documentation of the majority of patients – 95.6% (n=392) (Table 7).

Table 7 – Presence of recommendations for correction of the main modifiable risk factors and marks on their implementation in the study groups, (%)

Risk Factor	Total %, (n = 410)	ACVA %, (n = 229)	MI %, (n = 161)	ACVA+MI %, (n = 20)
Recommendations for risk factor correction				
Hypertension	88,5 (363)	95,6 (219)	81,4 (131)	65,0 (13)
Overweight	2,4 (10)	0,0 (0)	5,6 (9)	5,0 (1)
Smoking	1,9 (8)	0,9 (2)	6	0,0 (0)
Hyperlipidemia	3,4 (14)	0,0 (0)	5,6 (9)	25,0 (5)
Diet	0,2 (1)	0,0 (0)	0,0 (0)	5,0 (1)
Hypodynamia	0,2 (1)	0,0 (0)	0,6 (1)	0,0 (0)
None	3,2 (13)	3,5 (8)	3,1 (5)	0,0 (0)
Completed mark				
Marked	95,6 (392)	96,1 (220)	94,4 (152)	100,0 (20)

3.3 Assessment of patient adherence to treatment before and after the reference event over a 12-year follow-up period

Table 8 shows the frequency with which patients in the study groups visited a specialist (therapist, cardiologist, neurologist) by patients in the study groups, as well as the number of ambulance calls to patients' homes.

Table 8 – Rates of medical assistance seeking among patients included in the register, (%)

Indicator	Total %, (n = 410)	ACVA %, (n = 229)	MI %, (n = 161)	ACVA+MI %, (n = 20)

Visiting a general practitioner	97,1 (398)	100,0 (229)	93,8 (151)	90,0 (18)
Visiting a cardiologist	13,4 (55)	3,1 (7)	23,6 (38)	50,0 (10)
Visiting a neurologist	83,2 (341)	96,5 (221)	65,8 (106)	70,0 (14)
Home visit by a doctor	78,8 (323)	92,1 (211)	62,7 (101)	55,0 (11)
Calling an ambulance	69,5 (285)	79,5 (182)	56,5 (91)	60,0 (12)
Hospitalization for treatment	87,1 (357)	55,3 (227)	73,3 (118)	60,0 (12)

Analysis of the register data indicates a high level of patients consulting with therapists and an insufficient level of consultations with cardiologists. The highest frequency of ambulance calls was found in the ACVA group. The MI group had the highest percentage of hospitalizations, which requires attention from outpatient specialists. Table 9 shows data on the medical examination of patients included in the register.

Table 9. – Indicators of medical examination of patients included in the register

Reason for medical examination	Total %, (n = 410)	ACVA %, (n = 229)	MI %, (n = 161)	ACVA+MI %, (n = 20)
CVD	44,9 (184)	3,9 (9)	98,1 (158)	85,0 (17)
ACVA	54,4 (223)	95,6 (219)	0,6 (1)	15,0 (3)
Not observed	0,7 (3)	0,4 (1)	1,2 (2)	0,0 (0)

It was found that 95.6% and 98.1% of patients in the ACVA and MI groups, respectively, were under observation for their primary nosology. The created outpatient register enables analysis of medical examination effectiveness, assessment of cardiovascular risk factors prevalence, and determination of target indicator achievement frequency through modification.

Conclusion. The main clinical and epidemiological characteristics and risk factors were established in patients with a history of myocardial infarction and acute cerebrovascular accident. Laboratory and instrumental study results were analyzed,

and treatment adherence before and after the reference event was assessed over a 12-year follow-up period. A “portrait of a patient” with a history of an acute cardiovascular event was created: this is a male aged 67.7 ± 11.4 years (for patients with myocardial infarction) or 68.56 ± 10.9 (for patients with ACVA) with stage 1 obesity, holding secondary or vocational secondary education, having a disability group, who does not smoke and does not abuse alcohol. The required target levels of BP, lipid profile, and glycemia were not achieved.

Lipid metabolism disorders were identified in 36.8% of the patients included in the study. These changes were most frequently recorded in the MI+ACVA group (45%) and the ACVA group (38.0%). An insufficient level of lipid-lowering therapy prescription was established in all study groups: 21.7% of cases, the lowest of which was among patients with ACVA (7.9%). In the MI group, corrections were made in 38.5% of cases.

Failure to achieve target blood pressure levels in all study groups was evidenced by elevated levels above 139/89 mm Hg in 81.7% of cases, most frequently observed among patients with ACVA.

The insufficient level of adherence to medical recommendations for modifying major cardiovascular risk factors was established: the percentage of individuals who reduced excess weight was 2.4% (n=10), quit smoking – 1.9% (n=8), achieved target lipid profile values – 3.4% (n=14), adjusted nutrition– 0.2% (n=1), and increased physical activity – 0.2% (n=1). The highest level of adherence to recommended measures was observed concerning hypertension treatment – 88.5% (n=363).

The presented data demonstrate that creating registers is an important step towards the objective assessment of medical and demographic indicators and the development of scientifically based preventive measures at different levels of healthcare provision for cardiac patients. Registers are tools that enable the prediction of potential damage to public health caused by diseases of the circulatory system. Identifying the prevalence of modifiable cardiovascular risk factors will allow developing targeted preventive measures to reduce mortality and morbidity rates from diseases of the circulatory system, as well as creating precision rehabilitation programs that can be adapted to each patient's individual needs and living conditions.

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