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Drug therapy and tdherence in patients with coronary heart disease: results of the russian part of the EUROASPIRE V international multicenter study

Aim	To study the practice of drug treatment of ischemic heart disease (IHD) and the consistency of this practice with the established guidelines.
Material and methods	Results of the Russian part of the EUROASPIRE V study were compared with the general European population of the study. At ≥6 mos. and <2 years after the discharge from the hospital, patients were invited to visit the site for an interview. The drug therapy recommended upon discharge and taken by patients in the long-term as well as the patients' compliance with the treatment were analyzed. In Russian centers, 699 patients were registered, and 399 of them visited the centers for the interview.
Results	Upon discharge from the hospital, patients of the Russian cohort and of the entire study population were prescribed acetylsalicylic acid or other antiplatelet drugs (99.2% and 94.1%, respectively); beta-blockers (87.2 and 81.6%, respectively); angiotensin-converting enzyme (ACE) inhibitors (69.9% and 61.1%, respectively); sartans (16.5% and 14.2%, respectively); calcium channel blockers (19.3 and 19.4%, respectively); nitrates (8.0% and 22.5%, respectively); diuretics (31.1 and 32.5%, respectively); statins (98.0% and 85.0%, respectively); and anticoagulants (6.6 and 8.3%, respectively). For the long-term treatment, patients of the Russian cohort and of the entire study population took antiplatelets (94.7% and 92.5%, respectively); beta-blockers (83.2% and 81.0%, respectively); ACE inhibitors (60.2% and 57.3%, respectively); sartans (19.3% and 18.4%, respectively); calcium antagonists (21.1% and 23.0%, respectively); nitrates (9.0% and 18.2%, respectively); diuretics (31.8% and 33.3%, respectively); statins (88.2% and 80.8%, respectively); and anticoagulants (8.8% and 8.2%, respectively). High intensity hypolipidemic therapy was prescribed to 54.0% of patients in Russian centers and 60.3% of patients in the entire study. Both Russian and international patients evaluated their compliance with the prescribed medication as high.
Conclusion	According to results of the EUROASPIRE V study as compared to earlier studies, the practice of drug therapy in Russian patients with IHD has significantly approached European indexes. Further optimization is possible by a more extensive use of high intense hypolipidemic treatment and antidiabetic drugs with a documented positive effect on prognosis of cardiovascular diseases.

Keywords	Ischemic heart disease; secondary prevention; drug therapy; real-life practice
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Patients with atherosclerotic cardiovascular disease (CVD) are exposed to a very high risk of cardiovascular events (CVE). In addition to normalizing their lifestyle, they require adequate drug therapy that is based on agents proven to positively affect their prognosis [1, 2]. From analysis of medical records, patient surveys, and reports from pharmacies and health insurance companies [3], it is relatively easy to inventory the drugs received by a patient. Given the fundamental importance of rational drug therapy, patterns of CVD therapy have become an integral part of clinical registries and of monitoring trials.

Evaluation of drug therapy is a key aspect of the EUROASPIRE trial series [4, 5]. This is a monitoring program regularly carried out by the European Society of Cardiology (ESC) since the mid-1990s. It evaluates

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compliance of coronary artery disease (CAD) patient management with the latest version of the ESC Guidelines on cardiovascular disease prevention in clinical practice. The hospital part of this program includes patients with CAD after acute myocardial infarction (AMI), other acute coronary syndromes (ACS), percutaneous coronary interventions (PCI), and coronary artery bypass grafting (CABG).

The first report on the Russian results of the hospital part of EUROASPIRE V [6] assessed the effectiveness of traditional cardiovascular risk factor control in this category of CAD patients. This article also covers the analysis of various aspects of drug therapy in the Russian cohort and in the general population of the EUROASPIRE V trial.

Material and Methods

EUROASPIRE V [7] is a cross-sectional trial involving 27 European countries, including Russia. In each country, one or more geographic regions were selected where cardiological hospitals were present. Among these, one or more sites were chosen, so that all patients with ACS or indications for myocardial revascularization by PCI or CABG had a chance of being admitted. Four Russian sites participated in the trial: National Medical Research Center for Preventive Medicine (Moscow), City Hospital No. 36 (Moscow), Moscow Regional Cardiology Center (Zhukovsky), and the Regional Clinical Hospital (Barnaul). The Russian part of the EUROASPIRE V trial was approved by the participating institutional ethics committees.

At the study sites, all consecutively admitted patients, from 18 to 80 yrs, who were hospitalized for AMI or ACS without myocardial infarction, i.e., troponin levels not elevated, for PCI or CABG were identified based on regional registers or discharge summaries. Exclusion criteria were any severe, acute condition, decompensated chronic disease, severe mental disorder, and drug or alcohol abuse. All patients with CAD identified in the medical records were invited to interview visits for assessment of long-term outcomes of treatment, risk factors, clinical and psychological status, and quality of life. All patients signed informed consent forms to be included in the trial. The period from the time of patient identification to the interview visit was ≥6 mos and <2 yrs.

Drug therapy recommended at discharge was registered, based on analysis of medical records, either electronic registers or case records. Discharge summaries were used at the Russian sites. The drugs administered at the long-term stage and their doses were recorded, based on the patient survey at the interview visit. At this visit, the subjects were requested to bring all available medical records.

Treatment intensity was separately assessed for patients receiving lipid-lowering therapy. The following therapy options were considered high-intensity, i.e., with an expected decrease in the levels of low-density lipoprotein cholesterol (LDL-C) by ≥50%: atorvastatin 40–80 mg; rosuvastatin 20-40 mg; combinations of ezetimibe 10 mg and simvastatin 20–40 mg, pravastatin 40 mg; lovastatin 40 mg, fluvastatin 80 mg, atorvastatin 10–20 mg, rosuvastatin 5–10 mg; and proprotein convertase subtilisin/kexin type 9 (PCSK9) enzyme inhibitors.

Adherence to drug treatment was assessed from the patients' responses to the question, "How often did you take the prescribed drugs the last month?" The answer "always" corresponded to 100% adherence; "almost always" to 90%; "most of the time" to 75%; "about half the time" to 50%; and "less than half the time" to <50%.

All data were entered into a paper case report form used for all countries and into an electronic case report form of the ESC EURObservational Research Programme database. Statistical data analysis was carried out at the Department of Public Health in the Ghent University (Belgium) using version 9.4 of the SAS software suite (Statistical Analysis System, SAS Institute Inc., USA) using standard algorithms of variational statistics. Data are presented as mean ± SD or as median [25th quartile; 75th quartile].

Results and Discussion

A total of 699 patients with CAD were identified at the Russian sites (16,208 patients in the general trial population), of whom 399 patients had long-term interview visits (8,261 patients in the general population). The median time from the index hospital treatment and the interview visit was 0.92 yrs [0.67; 1.45] and 1.12 [0.82; 1.56] yrs in the Russian cohort and in the general population, respectively. The age of CAD patients in the Russian sample was 62.4 ± 9.6 yrs (25.8% female); the age of the subjects interviewed was 62.8 ± 8.7 yrs (27.1% female).

The drug treatment was assessed at two time points in the EUROASPIRE study. The rates of prescription of drug therapy to CAD patients at the end of the index hospital treatment and its administration by patients at the time of the interview visit are summarized in Table 1.

According to Table 1 data, antiplatelet agents were recommended to almost all Russian patients at the discharge, and the long-term rate of their administration remained high. The mean rate of pre-

scription of antiplatelet agents at discharge and their further administration was slightly lower in the general trial population than in the Russian cohort. Compared to 2013 EUROASPIRE IV [8], in which the rates of prescription of antiplatelet agents were 97.3% and 97.0% in the general population and in the Russian cohort, respectively, there was a slight increase in these rates in the Russian cohort and a slight decrease in the general population (Figure 1). In other EUROASPIRE V participant countries, the prescription rates of antiplatelet drugs at discharge after index hospital treatment were highest in Sweden (99.6%) and lowest in Slovenia and Egypt (77.9%, both). The percentage of patients who took antiplatelet drugs among those who attended visit interviews in the long-term period was the highest in Serbia (98.5%) and the lowest in the Netherlands (81.9%). There were neither sex-associated differences in the rate of administering antiplatelet drugs in the Russian cohort or in the trial as a whole, nor were there noticeable differences compared to the EUROASPIRE IV trial.

Lipid-lowering therapy is the cornerstone of modern treatment of patients with atherosclerotic CVD [1, 2]. The prescription and administration of statins is summarized in Table 1 and Figure 2. Statins were recommended to most Russian patients with CAD (98.0%) at hospital discharge, but the rate of administration decreased to 88.2% in the long-term. Statins were initially prescribed less frequently (85.0%) in the general trial population. The percentage of discharge summaries with statin prescriptions in the Russian cohort was the highest among all EUROASPIRE V countries. The lowest rates of statin prescriptions were observed in Ireland (59.2%). Comparison of the current data with the EUROASPIRE IV data [8] showed that the number of statin prescriptions slightly increased in the Russian cohort (from 88.5% to 98%) and decreased somewhat in the general population (from 88.7% to 85.0%). The rates of long-term statin administration were very high: 97.1% in Latvia, 92.7% in Romania, and 91.6% in the Czech Republic. The rates of long-term statin administration were the lowest in Central Asia (34.6% in Kazakhstan and 54.3% in Kyrgyzstan). As shown in Figure 2, there was an increase in the rates of statin administration in both male and female patients in the Russian cohort of the EUROASPIRE V trial compared to the IV trial, with female patients using these drugs relatively more often. On the contrary, statins were used slightly less in male and female patients in the general population.

Lipid-lowering drugs of other classes were recommended extremely rarely, or they were not recommended to patients with CAD in the countries participating in the EUROASPIRE V trials. No Russian CAD patients received fibrates. In the general EUROASPIRE V population, only 15 (0.2%) patients received PCSK9 inhibitors, and less than 2% received cholesterol absorption inhibitors and omega-3 fatty acid drugs.

Given the suboptimal lipid control evident in previous trials, the EUROASPIRE V trial focused on improving lipid-lowering therapy. Only 54.0% of patients with CAD (55.2% of male patients and 51.0% of female patients) received high-intensity lipid-lowering treatment in the Russian cohort. The percentage of such patients was slightly higher in the general trial population, 60.3% (60.9% of male patients and 58.4% of female patients). Patient-friendly, fixed combinations of lipid-lowering drugs were used in only 0.2% of the patients of the general EUROASPIRE V population.

The treatment regimen for most patients with a history of AMI, ACS, PCI, and CABG included beta-blockers (Table 1, Figure 3). They were recommended at discharge to more than 80% of patients both in the

Table 1. Drug therapy recommended to patients at discharge and used at the time of the interview visit in the Russian cohort and in the general populations of EUROASPIRE V

Drug Class	At discharge, %		At the interview visit, %	
	Russian cohort	General population	Russian cohort	General population
Acetylsalicylic acid or other antiplatelet agents	99.2	94.1	94.7	92.5
Beta-blockers	87.2	81.6	83.2	81.0
ACE inhibitors	69.9	61.1	60.2	57.3
ARBs	16.5	14.2	19.3	18.4
Calcium channel blockers	19.3	19.4	21.1	23.0
Nitrates	8.0	22.5	9.0	18.2
Diuretics	31.1	32.5	31.8	33.3
Statins	98.0	85.0	88.2	80.8
Anticoagulant drugs	6.6	8.3	8.8	8.2

ACE, angiotensin-converting enzyme; ARB, angiotensin II receptor blocker.

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Figure 1. EUROASPIRE IV and V administrate rates of antiplatelet drugs for the Russian cohort and for the general trial population at the time of the interview visit

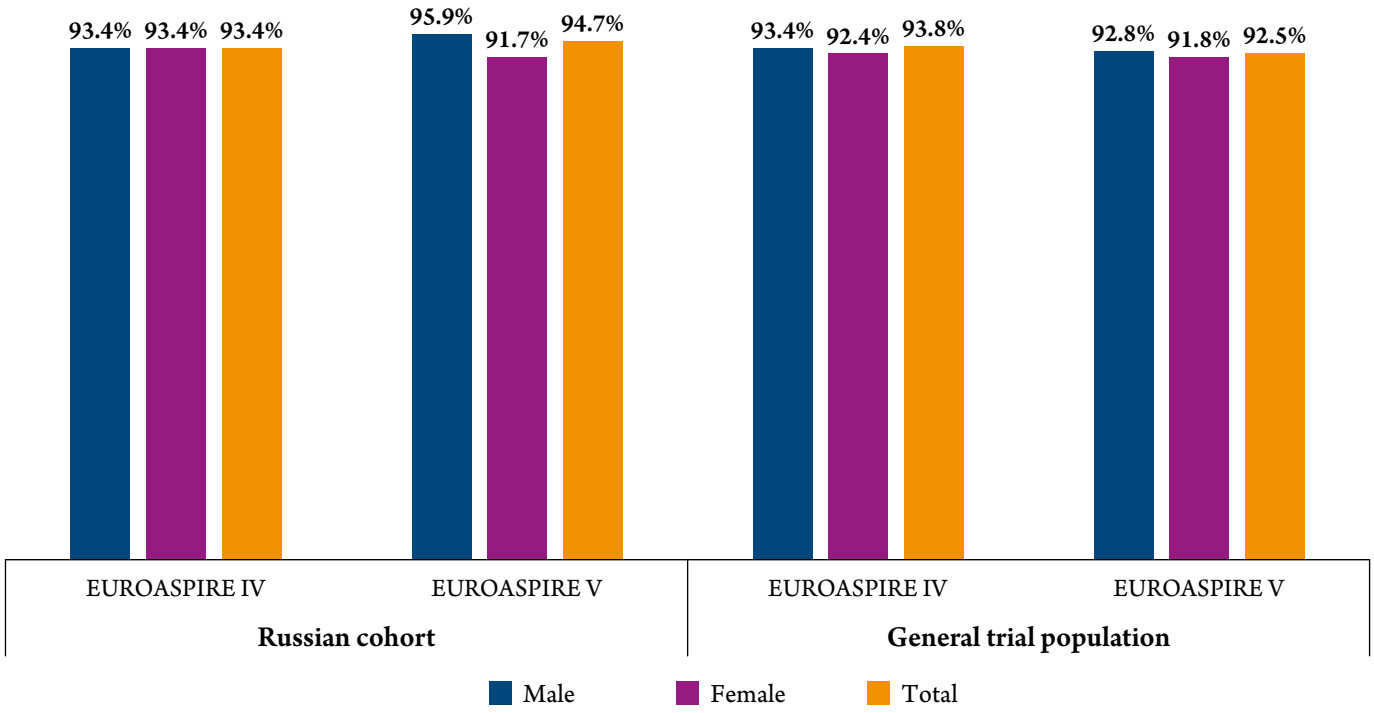
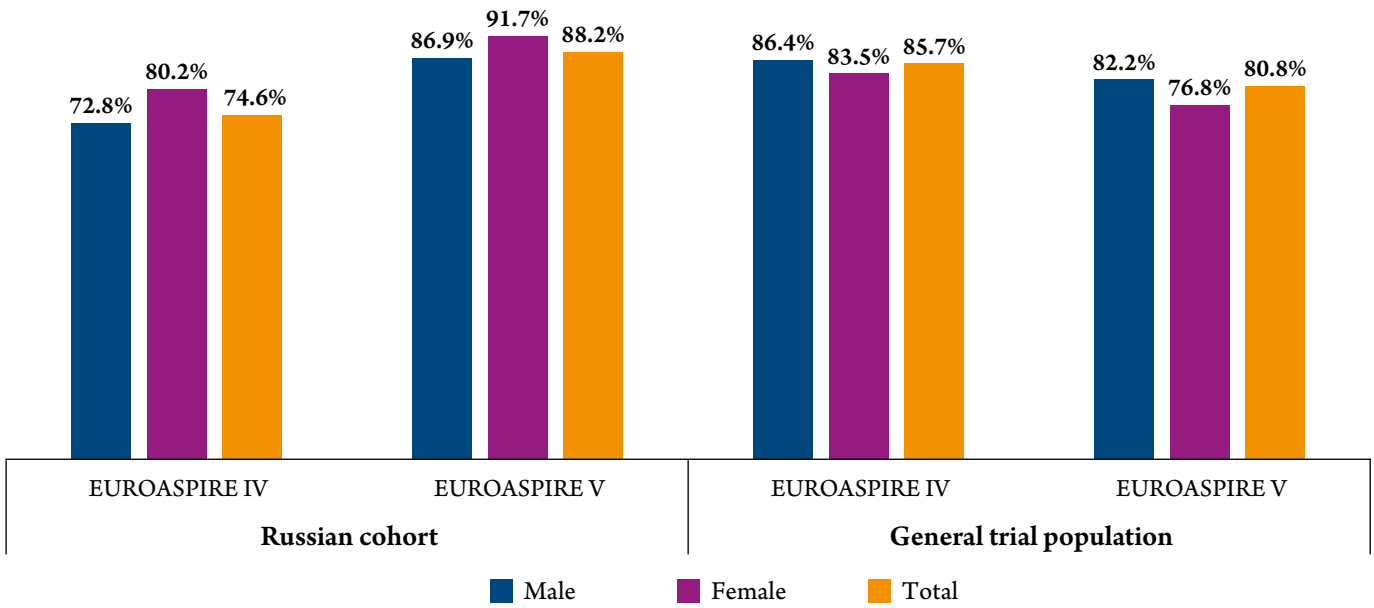


Figure 2. EUROASPIRE IV and V administrate rates of statins for the Russian cohort and for the general trial population at the time of the interview visit



Russia cohort and the general trial population. The percentage of discharge summaries with prescribed beta-blockers ranged from 59.9% (Netherlands) to 90.9% (Kazakhstan). There was a slight decrease in the prescription rates of drugs of this class compared to EUROASPIRE IV (88.5% in the Russian cohort and 84.8% in the general population) [8].

The rate of administration of beta-blockers at the interview visits was slightly increased in the Russian cohort of EUROASPIRE IV compared to EUROASPIRE V (Figure 3). This rate decreased in the general trial population. There were no significant sex-associated differences between the Russian cohort and the general population.

Maintaining normal blood pressure (BP) is one of the most important aspects of secondary prevention of CAD. The majority of patients received antihypertensive therapy at the time of the interview visit in the EUROASPIRE V trial: 95.0% in the general trial population (94.7% of male patients and 95.8% of female patients), and 97.2% in the Russian cohort (96.6% and 99.1%, respectively). Antihypertensive therapy included beta-blockers, ACE inhibitors, angiotensin II receptor blockers (ARB), calcium channel blockers (CCB), diuretics, and other drugs prescribed to normalize blood pressure.

Since beta-blockers have been separately discussed above, the current practice of prescribing renin-angiotensin-aldosterone system (RAAS) blockers, CCBs, and diuretics is presented. Among the two classes of RAAS inhibitors, ACE inhibitors were recommended much more often than ARAs to discharged patients both in the Russian cohort and the general population of EUROASPIRE V (Table 1; Figure 4). This ratio was the same at the long-term stage, but the percentage of patients taking ACE inhibitors decreased slightly by the time of the interview visit compared to patients to whom they were recommended, and contrarily the percentage of patients taking sartans increased in both the Russian cohort and in the general trial population. This is probably due to adverse events typical of ACE inhibitors, such as cough. Compared to the Russian cohort of EUROASPIRE IV [8], the rate of prescriptions of ACE inhibitors and ARBs slightly increased (60.1% and 11.4%, respectively) in EUROASPIRE V. The percentage of patients in the general trial population to whom continued use of ACE inhibitors was recommended remained almost the same, and the percentage to whom sartans were recommended increased slightly (from 11.6% to 14.2%). It should be noted that the rates of prescribing these two classes of antihypertensive drugs varied greatly among European countries from 25.4% in Finland to 83.3% in Serbia for ACE inhibitors, and from 4.3% in Latvia to 47% in Finland for ARBs. Significant variability between countries remained at the interview visit: from 22.1% in Finland to 86.9% in Serbia for ACE inhibitors, and from 5.7% in Serbia to 45.3% in Finland for ARBs.

As shown in Figure 4, despite the differences in the use of various RAAS inhibitors in different countries, approximately 75% of patients with CAD received ACE inhibitors or ARBs in the general population of EUROASPIRE V. Sex-associated differences in the use of RAAS inhibitors were not significant, and their use hardly changed compared to EUROASPIRE IV. Contrarily, the rate of administering RAAS inhibitors, distinctly increased in the Russian cohort, mainly among male patients, compared to the previous study.

CCBs were prescribed in the general trial population as a part of antihypertensive therapy and as antianginal agents. According to Table 1, CCBs were recommended in about every fifth discharge summary in the Russian cohort and in the general population. The percentage of patients taking CCBs increased slightly by the interview visit. The comparison of prescription options in EUROASPIRE IV [8] and EUROASPIRE V showed that the percentage of patients discharged with recommendations to continue taking CCBs remained very stable: 21.7% and 19.3% of patients in the Russian cohort, respectively, and 19.4% in both trials in the general population. Similarly, the percentage of patients receiving CCBs in EUROASPIRE IV and EUROASPIRE V remained almost unchanged at the interview visits (Figure 5) for the both Russian cohort and the general population. Female patients received CCBs more often in both trials. This was true for both the Russian cohort and the general population. In the EUROASPIRE V, the rates of CCB prescriptions varied significantly among countries, but it only slightly exceeded 30%, even in countries with high rates. The maximum rate was 33.8% in Kyrgyzstan, and the lowest rate was 7.0% in Spain. At the interview visits, the percentage of patients taking CCBs was highest in Serbia (34.3%) and lowest in Spain (11.7%).

The rates diuretic use in the EUROASPIRE V population (Table 1) were almost the same at the interview visit as at discharge. Diuretics were prescribed to about every third patient with CAD in the Russian cohort and in the general trial population. The rates of their administration in various EUROASPIRE V countries were also significantly heterogeneous, varying from 13.4% in the UK to 62.2% in Romania. The rates of long-term administration of diuretics differed more than 6-fold, with the lowest percentage of patients taking drugs of this class at the interview visit was recorded in Ireland (8.5%), and the highest in Romania (56.9%).

The use of diuretics in the Russian cohort and in the general trial population differed significantly between EUROASPIRE IV and EUROASPIRE V. For example, the rate of prescribing diuretics at discharge remained almost unchanged in the general population, 30.7% in EUROASPIRE IV and 32.5% in EUROASPIRE V, [8], and the percentage of patients taking diuretics increased slightly at the interview visits (Figure 6), mainly due to female patients. Conversely, the percentage of discharge reports with recommended

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Figure 3. EUROASPIRE IV and V administrate rates of beta-blockers
drugs for the Russian cohort and for the general trial population at the time of the interview visit

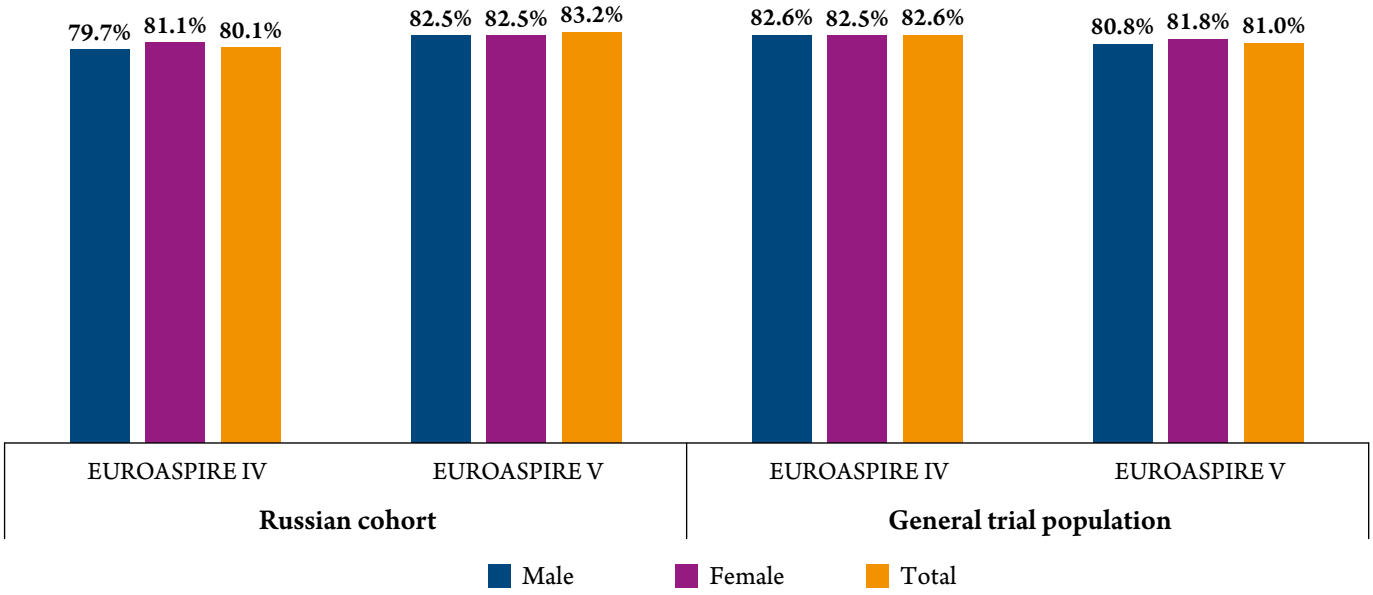
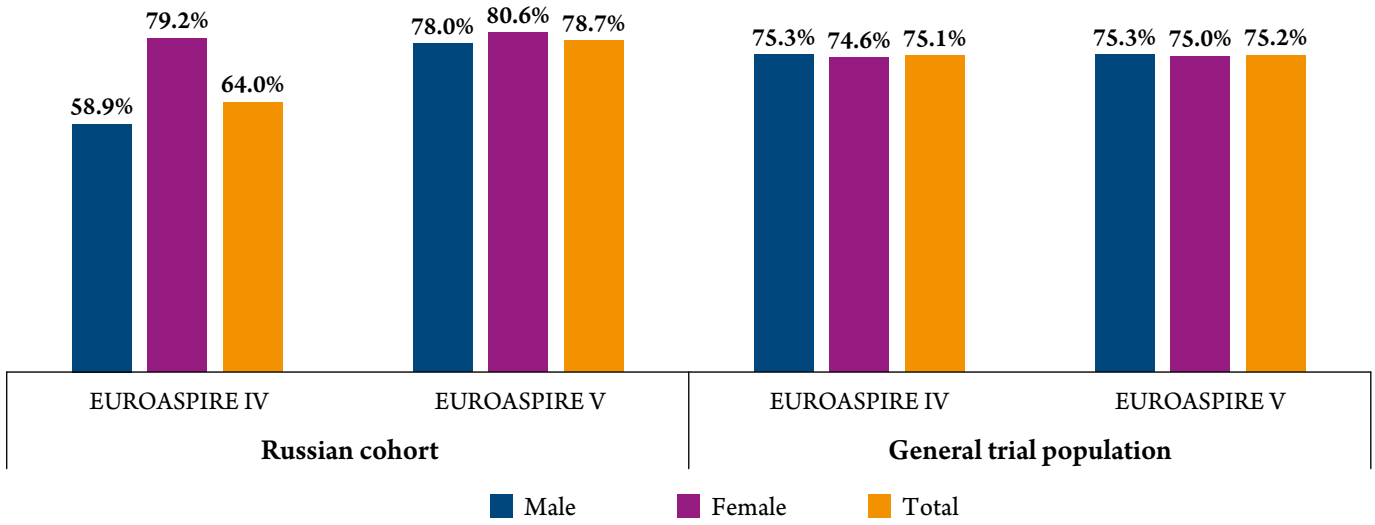
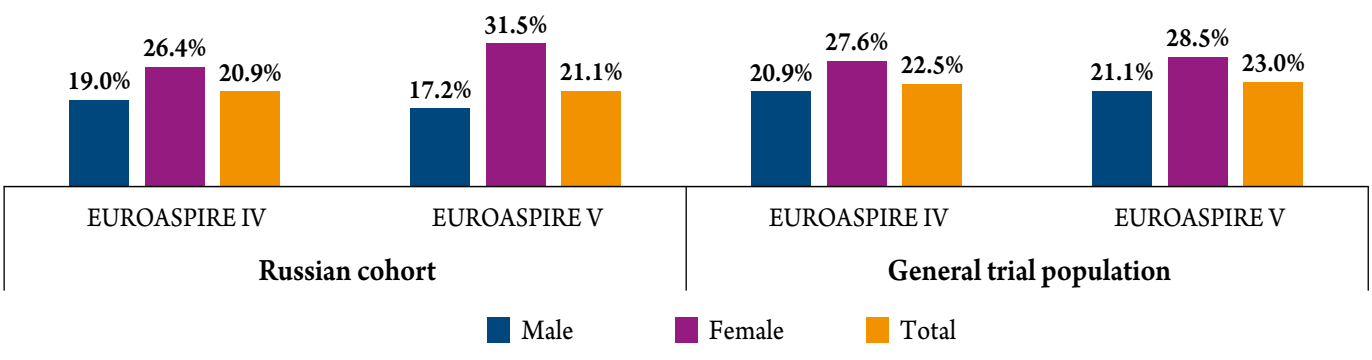


Figure 4. EUROASPIRE IV and V administrate rates of ACE inhibitors
and/or ARBs for the Russian cohort and for the general trial population at the time of the interview visit



ACE, angiotensin-converting enzyme; ARB, angiotensin II receptor blocker.

Figure 5. EUROASPIRE IV and V administrate rates of calcium antagonists
for the Russian cohort and for the general trial population at the time of the interview visit



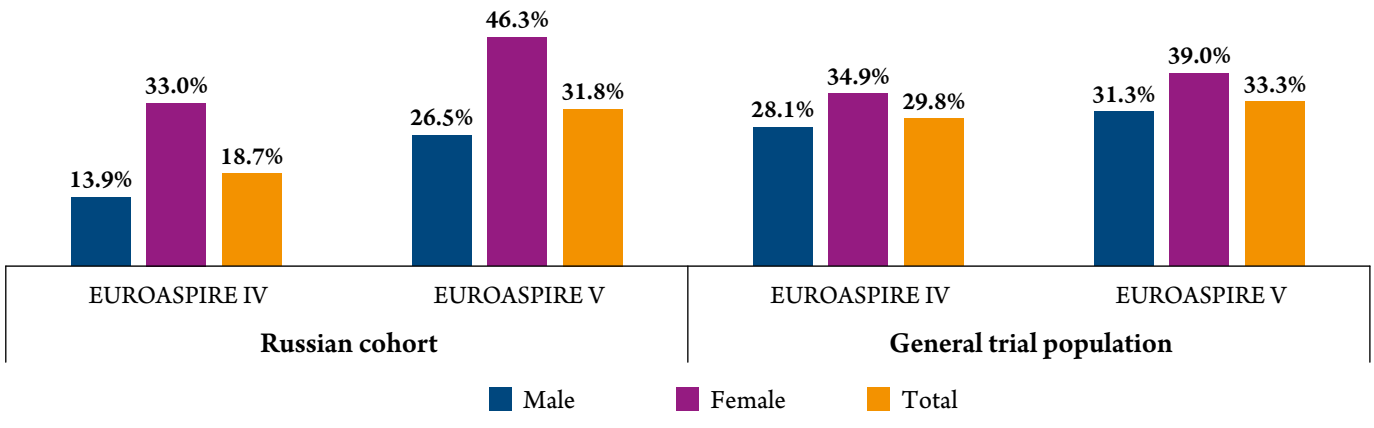
diuretics even decreased somewhat from 38.2 to 31.1% in the Russian cohort. In EUROASPIRE IV, the percentage of Russian subjects receiving diuretics decreased 50% to 18.7% by the interview visits, but, in EUROASPIRE V, the long-term rates almost did not change, i.e., the Russian cohort percentage approached the European value. Female patients were more likely to receive diuretics in the Russian cohort and the general populations of EUROASPIRE IV and EUROASPIRE V. The percentage of female patients receiving diuretics increased, most notably in Russian patients, in the more recent trial.

Anticoagulants have a well-proven ability to improve the prognosis in several clinical situations, such as atrial fibrillation (AF). Table 1 shows that anticoagulants were recommended at discharge to Russian patients with CAD relatively less frequently than in the general population of EUROASPIRE V. However, the percentage of Russian patients taking anticoagulants increased in the long-term and remained almost unchanged in the general trial population. Thus, these indicators were comparable at the interview visits (8.8% and 8.2%, respectively). This was likely an adequate administration rate of drugs of this class, considering that the prevalence of AF in patients with stable CAD is 0.2–5% [9], and that, given the inclusion criteria, all EUROASPIRE subjects could not have had a CHA2DS2-VASc score less than 1. However, there was significant variation in the rate of anticoagulant administration between different countries participating in EUROASPIRE V. Thus, at the time of discharge, the percentage of discharge summaries, which included anticoagulant recommendations, was the lowest in Ireland (only 1.7%), and they were recommended to almost every fifth patient (19.8%) in the Netherlands. The long-term rate of anticoagulant administration ranged from 1.8% in Turkey to 23.5% in the Netherlands. In comparison with EUROASPIRE IV, the mean rate of prescription at discharge slightly decreased from 9.2% to 8.3% in all participant countries, and the rate of administration at the time of the interview visit increased somewhat from 6.4% to 8.2%. In the Russian cohort, there was an obvious increase in the rate of anticoagulant administration from 2.5% to 6.6% at discharge and from 2.1% to 8.8% at interview visits. This rate approached the European mean values.

Unlike the drugs discussed above with well-known, positive effects on prognosis, nitrates, which had been administered to most patients in the earlier EUROASPIRE trials [8], lost ground to a much greater extent in the Russian cohort than in the general trial population. In the EUROASPIRE IV trial, nitrates were recommended at discharge to 28.2% of patients in the general population and to 42.2% of Russian patients. In EUROASPIRE V, the percentage of nitrate prescriptions decreased to 22.5% in the general population and to 8% in the Russian cohort (Table 1). There was significant variability in the rate of discharge prescription of nitrates among countries, e.g., from 1.3% in Slovenia to 82.4% in Sweden.

According to Table 1, fewer patients received nitrates in the general trial population in the long-term than at discharge, and, on the contrary, this percentage was slightly higher in the Russian cohort. There was a sharp, almost 67% decrease in the percentage of patients receiving nitrates compared to EUROASPIRE IV (Figure 7). This draws attention in the Russian cohort, where this decrease was much less pronounced (from 23.9% to 18.2%) than in the general population. The percentage of female patients receiving nitrates was slightly higher than that of male patients in the Russian cohort and in the general populations of both EUROASPIRE IV and V. There was significant regional heterogeneity in the rate of nitrate administration at

Figure 6. EUROASPIRE IV and V administrate rates of diuretics drugs
for the Russian cohort and for the general trial population at the time of the interview visit



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discharge and the interview visits, ranging from 2.7% in Slovenia to 81.6% in Sweden.

Finally, concerning glucose-lowering therapy in patients with known diabetes mellitus (DM), it should be noted that the first data on cardioprotective effects of sodium-glucose linked transporter type 2 (SGLT2) inhibitors and glucagon-like peptide-1 (GLP-1) agonists appeared during the in-hospital part of the EUROASPIRE V trial. Nevertheless, these classes of drugs were included in European and national clinical guidelines [10, 11] after completion of the study. Of the oral antihyperglycemic drugs, metformin was recommended at discharge to 14.3% of patients with CAD and DM in the general EUROASPIRE V population, sulfonylureas to 4.7%, incretins (GLP-1 agonists were not analyzed separately) to 2.6%, glinides and glitazones to 0.3%, SGLT2 inhibitors to 0.4%, and alpha-glucosidase inhibitors to 0.1%. Insulin was prescribed to 7.5% of patients. A separate country analysis was carried out only for metformin, the most commonly used drug, which was recommended in 8.8% of discharge summaries of the Russian cohort. Regional rates of metformin usage varied significantly in discharge summaries, from the lowest in Kazakhstan (6.3%) to the highest in Greece (37.0%). Since the previous study [8], there was an insignificant increase in the rates of metformin prescription at discharge. These increases were 8.6% and 13.4% in the Russian cohort and in the general trial population, respectively.

At the interview visits, the percentage of patients receiving antihyperglycemic drugs increased slightly for almost all classes of drugs analyzed in the EUROASPIRE study: metformin, 18.0%; sulfonylureas, 5.7%; incretins, 3.3%; SGLT2 inhibitors, 0.9%; glinides, 0.2%; glitazones, 0.3%; alpha-glucosidase inhibitors, 0.1%; and insulins, 8.6%. A separate country analysis of glucose-lowering drug classes was not done. However, 72.4% of the Russian patients with known DM reported at the interview visits that they had received oral glucose-lowering drugs. 14.9% of patients reported insulin therapy, and 47.1% reported that they followed a heathy diet and followed other drug-free recommendations. In the general trial population, these respective values were 73.7%, 31.7%, and 56.7%. This more than twofold difference in the rates of insulin therapy in the Russian cohort and in the general population was also observed in EUROASPIRE IV [8].

Treatment adherence is an important factor that largely determines the success of medical care for patients with any condition requiring long-term treatment. Unlike the previous EUROASPIRE trials, in which patients were asked about their adherence to prescribed drugs in general without dividing them into classes, EUROASPIRE V separately assessed adherence with respect to lipid-lowering, antihypertensive, and glucose-lowering agents. According to Table 2, most patients of the Russian cohort and in the general population of EUROASPIRE V self-assessed their adherence to drug treatment as high. More than 90% of subjects reported that they took their drugs as prescribed 90–100% of the time. These values were almost the same as in EUROASPIRE IV [8], in which 79.4% of patients of the Russian cohort and 74.1% of the general trial population stated that they always took the prescribed drugs, and 13.9% and 19.9% of the subjects took the prescribed drugs almost always. In the EUROASPIRE V trial, the assessment of adherence by Russian patients was similar to the mean European values, with the exception of glucose-lowering drugs, for which the Russian subjects more often declared 100% adherence.

EUROASPIRE V has obvious advantages as listed above, but it also has limitations. These include 1) a snap-

Figure 7. EUROASPIRE IV and V administrate rates of nitrates for the Russian cohort and for the general trial population at the time of the interview visit

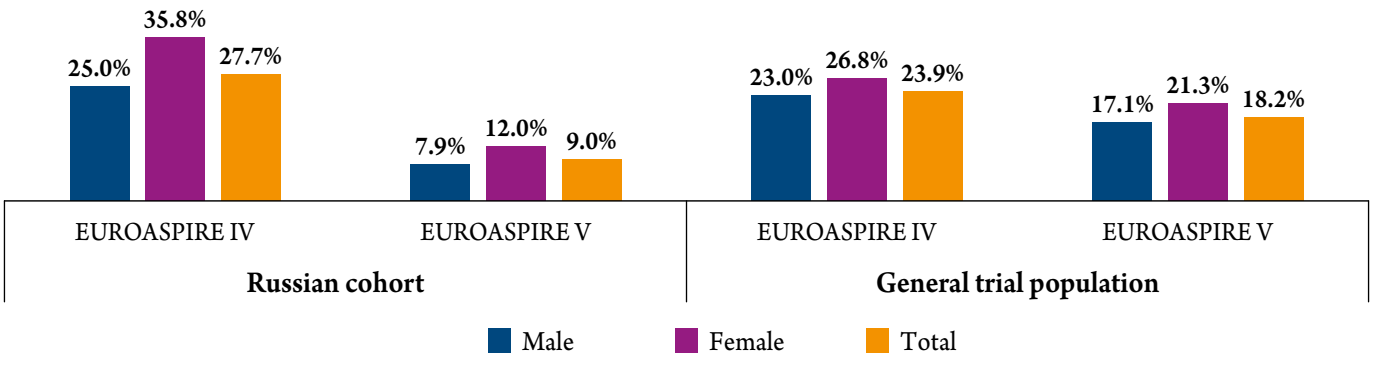

Table 2. Self-assessment by patients of adherence to drug treatment in the Russian cohort and in the general population of EUROASPIRE V

Treatmment	Adherence to drug treatment by patient's self-assessment				
	100	90	75	50	<50
Hypolypidemic treatment					
Russian cohort	79.9	15.4	2.5	1.4	0.8
General population	76.4	15.3	4.5	1.6	2.1
Antihypertensive treatment					
Russian cohort	79.7	15.6	2.1	1.8	0.8
General population	78.9	14.1	4.3	1.3	1.4
Glucose-lowering drug					
Russian cohort	91.2	6.2	2.5	0.0	0.0
General population	79.8	14.2	3.0	1.2	1.7

shot design, 2) incomplete representativeness of the results for the participant countries due to the inclusion of sites from a limited number of regions in each country, and due to inclusion of specialized centers and university clinics where the level of care is significantly above average. It should be noted that to overcome these limitations, the geography of EUROASPIRE V was significantly expanded compared to earlier trials; moreover, in each region, only one specialized center or university clinic could participate in the trial.

A weakness of the analysis of treatment adherence was the patients' direct responses to questions about the regularity of taking medicines during the month preceding the interview visit instead of using a validated questionnaire. Since strict adherence to medical recommendations is socially desirable behavior, this direct method of assessing adherence was likely to be a source of distortion [12], as patients tried to "look good" in front of the researchers. For example, long-term adherence assessed using the Morisky-Green questionnaire was only 47.6% in the Khabarovsk AMI register [13]. Nevertheless, the findings of the EUROASPIRE trials are of significant interest in terms of comparing the data obtained across Europe and the corresponding Russian registers. It would be the most logical to compare the data on drug therapy at discharge with the results of the large ACS RECORD-3 register (n=2,370; 47 participant hospitals) [14, 15].

This register had been conducted relatively earlier (between EUROASPIRE IV and EUROASPIRE V) and demonstrated a slightly lower rate of prescriptions for the main classes of cardioprotective drugs, acetylsalicylic acid (88%) and statins (87%). The rates of administration of ACE inhibitors and sartans was comparable (81%), the same as for beta-blockers (84%). The comparison of the results of RECORD-3 with earlier RECORD registers showed, like in the EUROASPIRE program, an increase in the rates of using antiplatelet drugs and statins and a decrease in the rates for prescribing nitrates [15].

Among registries with available long-term, follow-up data for patients with a history of coronary events, the duration of the long-term stage of EUROASPIRE V was comparable to that of the Khabarovsk AMI register [13]. In that study, the rate of using acetylsalicylic acid 2.5 yrs after the index event was 87.8%, statins, 65.1%, beta-blockers, 73.8% (less than in EUROASPIRE V), and the rate of using RAAS inhibitors was comparable to that in the Russian cohort (76.0%). The rate of administering high-intensity statin therapy (24.0%) was 50% less than in EUROASPIRE V, possibly due to regional characteristics.

Conclusion

According to the EUROASPIRE V study, drug treatment at hospital discharge and in the long-term follow-up period for AMI, ACS, PCI, or CABG underwent positive changes compared to earlier trials and approached European averages. Nevertheless, there is room for further improvement, mainly by more frequent use of high-intensity lipid-lowering therapy, including during the long-term, outpatient period. In addition, RAAS blockers and modern classes of glucose-lowering drugs should be introduced into routine clinical practice. The Russian cohort used less nitrates than the EUROASPIRE V general population. As in previous EUROASPIRE trials, use of the main classes of cardioprotective drugs by female patients did not differ or exceeded that of male patients. Russian patients in the EUROASPIRE V trial, like patients in other countries, rated their adherence to treatment with the main CAD drug classes as high.

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