

## Original Article

**Awareness of cardiovascular disease, its risk factors, and its association with attendance at outpatient clinics in acute coronary syndrome patients****Sergey Yu. Martsevich<sup>a</sup>, Yulia V. Semenova<sup>a,\*</sup>, Natalia P. Kutishenko<sup>a</sup>, Alexandr V. Zagrebelsky<sup>a</sup>, Moisey L. Ginzburg<sup>b</sup>**<sup>a</sup> Federal State Institution National Research Center for Preventive Medicine, Moscow, Russian Federation<sup>b</sup> Lyubertsy District Hospital, Lyubertsy, Russian Federation

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## ABSTRACT

**Background:** The objective was to assess patients' awareness of cardiovascular disease, its risk factors, and its association with attendance at outpatient clinics in patients with acute coronary syndrome (ACS).

**Methods:** All patients of the Lyubertsy Infarct Survival Study-3 registry hospitalized with ACS from November 1, 2013, to July 31, 2015, were included ( $n = 397$ ). We used medical histories and specifically designed checklists. Awareness was assessed in survived patients ( $n = 320$ ) for dyslipidemia, diabetes, arterial hypertension, and previous myocardial infarction. Patients were divided into three groups depending on their attendance at outpatient clinics prior to ACS: attendants, partially compliant to attendance, and nonattendants.

**Results:** Our study showed several differences between medical history data received from patients and data obtained from objective examination, which was true for arterial hypertension ( $p < 0.05$ ) and particularly for dyslipidemia ( $p < 0.01$ ). The majority of patients were aware of diabetes. All patients knew about previous myocardial infarction. Awareness of arterial hypertension slightly increased with increasing attendance ( $p > 0.05$ ), whereas awareness of dyslipidemia increased dramatically ( $p < 0.01$ ).

**Conclusion:** Our study showed significant differences between medical history data received from patients and data obtained from objective examination for several cardiovascular disease risk factors in patients with ACS. Awareness of dyslipidemia was very low. It increased dramatically with increasing attendance. At the same time, there was only a slight increase in awareness of arterial hypertension with increase of attendance.

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## 1. Introduction

Acute coronary syndrome (ACS) is one of the most dangerous complications of ischemic heart disease. It is well known that development of ischemic heart disease mostly depends on the presence of cardiovascular disease (CVD) risk factors. Therefore, awareness of CVD risk factors plays an important role in the prevention of CVD and its complications.<sup>1</sup> A number of studies surveyed patients' awareness of CVD risk factors—dyslipidemia, arterial hypertension, diabetes mellitus—and demonstrated that patients' awareness of these CVD risk factors is not always high.<sup>2–6</sup> There also are some studies on factors associated with patients' lower awareness of CVD risk factors. The most common factors affecting awareness were age, family history of a specific risk factor, physical activity, smoking, and drinking alcohol.<sup>7–9</sup>

In previous studies, we identified the problem of patients' low attendance at outpatient clinics within the Lyubertsy Infarct Survival Study (LISS)-3 ACS registry.<sup>10,11</sup> We did not find any data on the association of patients' awareness of CVD risk factors with their attendance at outpatient clinics in available sources of literature.

The aim of this study is to assess patients' awareness of CVD, its risk factors, and its association with attendance at outpatient clinics prior to ACS within the registry.

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## 2. Methods

### 2.1. Study design

We used the data of the LISS-3 registry, which started in November 2013 in Lyubertsy District Hospital and is a hospital prospective observational study.

In this part of the study, we included all patients hospitalized with ACS from November 1, 2013, to July 31, 2015. The final diagnosis was confirmed during reference hospitalization by typical clinical features, electrocardiography and echocardiography abnormalities, and biochemistry markers of myocardial infarction. Of 397 patients admitted to the hospital, 77 (19.4%) patients died in the hospital (50 of them died within the 1<sup>st</sup> 1–2 days of hospitalization).

For the present study, we used medical histories and specifically designed checklists containing questions about the history of the present illness and past medical history, regularity of attendance at outpatient clinics prior to reference ACS, and current medical therapy. The forms were completed by doctors in charge.

We assessed awareness of CVD and its risk factors only for survived-to-discharge patients ( $n=320$ ), because patients were asked to answer questions from a checklist (after providing written informed consent) at hospital discharge. For nonsurvivors, we analyzed data received from objective examination and available medical histories and compared them with survivors.

Patients' awareness of CVD and its risk factors was assessed through comparison of patients' medical history data (data received from patients) and data received from objective examination.

### 2.2. Data management

Objective data on the presence of CVD and its risk factors were assessed in survived patients for dyslipidemia (by lipid profiles taken during hospitalization; dyslipidemia was defined according to current European Society of Cardiology [ESC]/European Atherosclerosis Society [EAS] guidelines for the management of dyslipidemias),<sup>12</sup> diabetes mellitus (by blood glucose tests), arterial hypertension (defined according to current ESC/EAS guidelines<sup>13</sup> as values  $\geq 140$  mmHg systolic blood pressure and/or  $\geq 90$  mmHg diastolic blood pressure, based on dynamic control of blood pressure levels during hospitalization), previous myocardial infarction (diagnosed according to current ESC/EAS guidelines<sup>14,15</sup> by postinfarction cicatricial changes on electrocardiogram Q wave, and regional hypokinesia on echo in areas different from the acute myocardial infarction zone). It was impossible to evaluate previous stroke by magnetic resonance imaging because of organizational reasons.

All patients were divided into three groups according to their attendance at outpatient clinics prior to reference ACS: (1) attendants—patients who visited a cardiologist or primary care physician at outpatient clinics once a year or more often ( $n=139$ ); (2) partially compliant to attendance—those who visited their doctor less than once a year, often irregularly ( $n=103$ ); (3) nonattendants—patients who had never visited a primary care doctor or cardiologist prior to ACS ( $n=78$ ).

### 2.3. Ethics

The study was approved by the local Ethical Committee of the Lyubertsy District Hospital and the local Ethical Committee of National Research Centre for Preventive Medicine, Moscow.

### 2.4. Statistics

Data were analyzed using statistical program IBM SPSS Statistic version 20 (IBM Corp. Released 2011. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.). Descriptive statistics, including medians and proportions, were used to summarize participants' baseline sociodemographic and clinical characteristics. The  $\chi^2$  test was used for comparative analysis of categorical variables. The Mann-Whitney test was used for qualitative variables with non-normal distribution.

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## 3. Results

First, we compared clinical characteristics of patients who survived to discharge and those who died during admission. **Table 1** shows that patients who died during admission were older ( $p<0.0001$ ) and were more likely to have a history of myocardial infarction ( $p<0.05$ ), atrial fibrillation ( $p<0.0001$ ), or stroke ( $p<0.01$ ). There was no significant difference among the groups in history of ischemic heart disease, arterial hypertension, and diabetes mellitus.

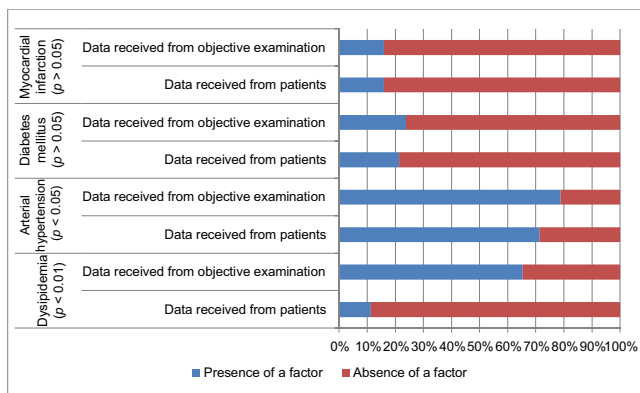
For survived-to-discharge patients, there was a statistically significant difference between medical history data of dyslipidemia and arterial hypertension received from patients and that obtained from objective examination of patients. How-

**Table 1 – Descriptive characteristics of acute coronary syndrome patients with different short-term outcomes of the disease.**

Parameters	All patients (n = 397)	Survivors (n = 320)	Nonsurvivors (n = 77)	p*
Females	177 (44.6%)	132 (41.3%)	45 (58.4%)	0.006*
Age (y), median (25%; 75%)	66 (57; 77)	64 (55; 76)	76 (67; 82)	0.0001†
History of ischemic heart disease	143 (36.0%)	112 (35.0%)	31 (40.3%)	0.388*
History of myocardial infarction	73 (18.4%)	51 (15.9%)	22 (28.6%)	0.01*
History of angina pectoris	82 (20.7%)	71 (22.2%)	11 (14.3%)	0.124*
History of stroke	38 (9.6%)	24 (7.5%)	14 (18.2%)	0.004*
History of atrial fibrillation	23 (5.8%)	9 (2.8%)	14 (18.2%)	0.0001*
History of arterial hypertension	309 (77.8%)	252 (78.8%)	57 (74.0%)	0.370*
History of diabetes mellitus	101 (25.4%)	76 (23.8%)	25 (32.5%)	0.115*

\*  $\chi^2$  Test was used for comparative analysis of categorical variables.

† Mann-Whitney test was used for qualitative variables with non-normal distribution.



\*  $\chi^2$  test was used.

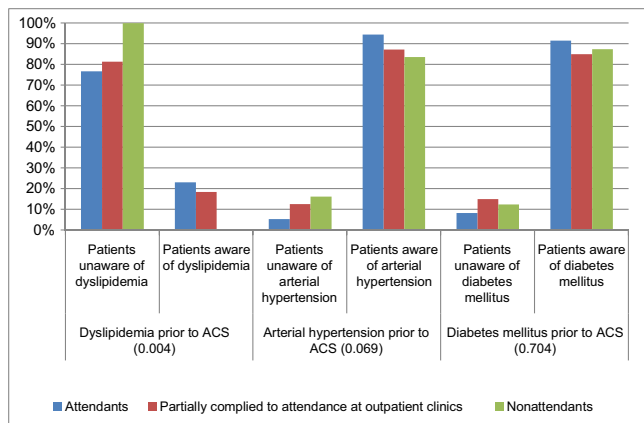
**Fig. 1 – Descriptive characteristics of medical history data received from patients and data obtained from objective examination of patients.**

ever, the majority of patients with arterial hypertension were aware of it (228 of 252 patients), while only a few patients with dyslipidemia were aware of this CVD risk factor (36 of 209 patients). For diabetes mellitus, there was no significant difference between medical history data received from patients and data obtained from objective examination of patients (68 of 76 patients were aware of diabetes). All patients with previous myocardial infarction were aware of it (51 patients; Fig. 1).

Fig. 2 compares awareness of dyslipidemia, arterial hypertension, and diabetes mellitus prior to reference ACS among the patients of the three groups of attendance at outpatient clinics. There was a statistically significant increase in awareness of dyslipidemia ( $p = 0.004$ ) and statistically insignificant increase in awareness of arterial hypertension ( $p = 0.069$ ) with increasing attendance level. All nonattendants were unaware of dyslipidemia. There was no association between patients' awareness of diabetes mellitus and their attendance at outpatient clinics ( $p = 0.704$ ).

#### 4. Discussion

Prospective clinical registries complemented by specially designed questionnaires make it possible to receive objective



\*  $\chi^2$  test was used.

**Fig. 2 – Awareness of dyslipidemia, arterial hypertension, and diabetes mellitus prior to reference acute coronary syndrome (ACS) in patients of the three groups of attendance at outpatient clinics.**

information about patients' awareness of CVD and its risk factors and about their adherence to treatment, including their attendance at outpatient clinics, prior to reference ACS.

Hospital ACS registry LISS-1 conducted in the district hospital in Lyubertsy (suburb of Moscow, Russia, with a population of 190,480) in 2005–2011 demonstrated prehospital characteristics of patients with myocardial infarction, their medical history, quality of prehospital treatment, and disease outcomes.<sup>16,17</sup> It was shown that medical histories usually lacked information on some CVD risk factors (history of dyslipidemia data was obtained only for 1/3 of all patients).<sup>16</sup> Hence, we decided to conduct a special research study within the LISS-3 registry to analyze patients' awareness of CVD and its risk factors.

Unstable condition of patients who died in the hospital on their admission made it difficult to obtain full information on awareness of some CVD risk factors (dyslipidemia, smoking, obesity) and on their attendance at outpatient clinics. We had the option of receiving this information only for survivors. Therefore, we compared survivors and nonsurvivors using data obtained from their objective examination and available medical histories and found that nonsurvivors were older and

more likely to have a history of myocardial infarction, atrial fibrillation, and stroke.

The problem of patients' awareness of CVD risk factors (dyslipidemia, arterial hypertension, and diabetes mellitus) was analyzed in a number of studies earlier. It was demonstrated that many patients were unaware of CVD risk factors.<sup>2,3,6,18,19</sup> Patients tend to be more aware of arterial hypertension (80.3% women; 75% men)<sup>4</sup> than dyslipidemia (18.2% women; 13.6% men).<sup>5</sup>

Our study showed significant differences between medical history data received from patients and data obtained from objective examination of patients for dyslipidemia and arterial hypertension. However, there was also a significant difference between awareness of arterial hypertension and awareness of dyslipidemia. Most patients were aware of arterial hypertension, but the minority of them knew about dyslipidemia. Nearly all patients were aware of diabetes mellitus. Further, absolutely all patients knew of previous myocardial infarction.

Several studies analyzed factors associated with patients' unawareness of CVD risk factors. He et al<sup>8</sup> showed that patients with body mass index  $\geq 24$  kg/m<sup>2</sup>, family history of dyslipidemia, elderly patients, and retirees were more aware of dyslipidemia. Alcohol drinking, cigarette smoking, and physical activity were associated with a lower level of awareness of dyslipidemia. Wang et al<sup>9</sup> demonstrated that patients with family history of diabetes mellitus and those who frequently exercise were more likely to be aware of diabetes mellitus. At the same time, alcohol drinkers and cigarette smokers were less likely to be aware of their blood glucose levels. Méndez-Chacón et al<sup>7</sup> demonstrated that men and smokers were less aware of arterial hypertension. History of ischemic heart disease, stroke, diabetes mellitus, and obesity were associated with patients' awareness of arterial hypertension. Patients who had been home visited by community health workers were less likely to be unaware of their hypertension.

In our study, we analyzed the association of patients' awareness of CVD risk factors only with their attendance at outpatient clinics prior to reference ACS. It was demonstrated that patients' awareness of dyslipidemia was very low, awareness of arterial hypertension was slightly better, and the highest awareness was demonstrated for diabetes mellitus. Patients' low awareness of dyslipidemia and its increase with increasing attendance levels unlike patients' awareness of diabetes mellitus (which is pretty high), may be due to the fact that glucose level control is a routine method in outpatient clinics practice in the Russian Federation. It is often administered to patients of every age, unlike lipid profile, which is often administered within the framework of the full examination of patients with diagnosed CVD or its risk factors, or to elderly patients as a part of dispensary observation—a program, which enables Russian citizens with chronic diseases and their risk factors to receive a free consultation and examination in outpatient clinics. Patients' awareness of arterial hypertension was also higher than awareness of dyslipidemia. This can be explained by the fact that most patients have an opportunity to check their blood pressure at home, except for those who do not have symptoms of arterial hypertension and

do not visit their doctor at outpatient clinics who can draw their attention to this problem.

Our study revealed that despite the opportunity given by this program to receive a free consultation, many patients were unaware of CVD and its risk factors. For some patients, not attending health facilities was their voluntary decision. A study previously conducted within the LISS registry demonstrated that half of the surveyed patients with ACS had not attended outpatient clinics, even though they had known about the dispensary observation program.<sup>20</sup> This unawareness may lead to a low quality of treatment. In our previous publication, we demonstrated that the overall quality of pre-hospital therapy was better in patients with higher attendance rate who were more aware of CVD and its risk factors; however, even in attendants, the quality of primary and secondary medical prevention was far from that recommended by current clinical guidelines.<sup>21</sup> The results of our study may be of value for practical healthcare. We are planning to proceed with the LISS-3 registry and to analyze other aspects of adherence (doctors' adherence to current clinical guidelines and patients' adherence to doctors' recommendations) using new enhanced questionnaires.

In conclusion, our study showed significant differences between medical history data received from patients and data obtained from objective examination for several CVD risk factors in patients hospitalized with ACS. Practically all patients were aware of their diabetes mellitus, and most of them were aware of arterial hypertension; however, few patients with dyslipidemia were aware of this CVD risk factor. All patients knew of previous myocardial infarction. Awareness of dyslipidemia increased dramatically with increasing attendance level; however, there was only a slight increase in awareness of arterial hypertension.

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## Conflicts of interest

All authors have no conflict of interest to report.

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Sergey Yu Martsevich: substantial contributions to conception and design; revising the article critically for important intellectual content; final approval of the version to be published. Yulia V. Semenova: analysis and interpretation of data; drafting the article. Natalia P. Kutishenko: substantial contributions to conception and design; revising the article critically for important intellectual content. Alexandr V. Zagrebnyy: substantial contributions to conception and design. Moisey L. Ginzburg: substantial contributions to conception and design.

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