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Factors affecting the uptake of national practice guidelines by physicians treating common CVDS in out-patient settings

Aim To study factors that influence the consistency of real prescriptions with applicable national guidelines for outpatient physicians in the management of patients with common cardiovascular diseases (CVDs).

Material and methods This was a cross-sectional study based on 16 randomly selected municipal polyclinics, where internists filled in validated questionnaires, including the Maslach Burnout Inventory – Human Services Survey (MBI-HSS), Hospital Anxiety and Depression Scale (HADS), Visual Analogue Scale (VAS), WHO Quality of Life – BREF (WHOQOL-BREF), and the Personal Decision-Making Factors (PDF-25). Participating physicians provided outpatient case reports of sequentially arriving patients with a high risk of CVD or confirmed CVDs during 2–3 working days, corresponding to the questionnaire period of ±1 week. The consistency of the prescriptions recorded in these case reports with the Russian Society of Cardiology (RSC) Guidelines was assessed.

Results This study included 108 physicians (mean age, 44.0±13.1 years, 87.0% women) who provided case reports of 341 patients (mean age, 64.4±13.2 years, 59.5% women) with most common diagnoses of arterial hypertension (92.1%), ischemic heart disease (60.7%), and chronic heart failure (32.8%). According to results of multivariate regression analysis, the following factors increased the likelihood of the prescription inconsistency with the guidelines: the fact that the physician had the highest attestation category (OR 2.56; 95% CI 1.39–4.7; p<0.002), attended professional events less than 2 times in 5 years (OR 2.23; 95% CI 1.18–4.22; p=0.013), had an additional, part-time job (OR 15.58; 95% CI 1.51–160.5; p=0.021), was prone to prescribe familiar trade names (OR 2.04, 95% CI 1.08–3.85; p=0.028), perceived drug supply problems as an important factor influencing the decision making (OR 5.13, 95% CI 2.69–9.75; p<0.001), and a total score on the emotional exhaustion scale (OR 1.03, 95% CI 1.01–1.06; p=0.031). Also, this likelihood was increased by older age of the patient (OR 3.29; 95% CI 1.65–6.55; p<0.001) and excessive alcohol consumption by the patient (OR 1.79, 95% CI 1.31–2.43; p<0.001). The likelihood of non-compliance with the guidelines was reduced by a high assessment of own health status according to the WHOQOL-BREF questionnaire (OR 0.19; 95% CI 0.05–0.72; p=0.014), a high assessment of own working conditions (OR 0.76; 95% CI 0.64–0.9; p=0.002), and postgraduate education within the last 5 years (OR 0.14; 95% CI 0.06–0.36; p<0.001).

Conclusion The study identified the factors that influence the likelihood of the consistency of prescriptions made by outpatient physicians for patients with CVD with applicable national clinical guidelines. Among these factors, the most important ones were access to educational events, additional, external part-time job, indicators of inertia of previous practice, problems with drug provision, satisfaction with own health status and working conditions, and emotional exhaustion (a component of professional burnout), older age of patients and their excessive alcohol consumption.

Keywords Clinical guidelines; clinical decision making; compliance; cardiovascular diseases

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As in many other large economies, cardiovascular diseases (CVDs) have long been the leading cause of death in the working-age population in Russia [1, 2]. For this reason, significant efforts are made to develop, study, and implement various policies aimed at improving this situation. Along with the development of new treatment regimens and other approaches for preventing primary and

subsequent cardiovascular events, the quality of medical care can be improved by focusing on production processes and working conditions for physicians [3].

However, despite investment in numerous emerging CVD treatment methods and resources, the end result largely depends on individual physicians making certain clinical decisions, prescribing treatment, and giving recommendations to patients during the course of face-to-face consultations. When making clinical decisions, physicians analyze the patient's medical history and examination findings in the light of their professional experience to balance the risk/benefit ratio for the patient in terms of the expected results of different medical interventions [4]. At the same time, a significant part of the working hours of physicians is occupied by completing the corresponding medical documentation, as well as solving administrative problems and issues related to the treatment and examination of patients [5]. Irrespective of their areas of specialization, physicians the need to make clinical decisions during their professional lives. Whenever a physician makes a decision regarding treatment or examination of a patient, he/she is dependent on many factors that influence the decision-making process, including purely medical factors (e.g., examination and laboratory findings, individual patient characteristics) and other important non-clinical factors [6–8].

In recent decades, clinical guidelines have been used to facilitate clinical decision-making and optimize the care provided to patients. Such guidelines, which are developed at regular intervals by the relevant international and national professional organizations, set out to summarize all available evidence on a certain clinical issue. Nevertheless, despite the activities of the European Society of Cardiology (ESC) and the Russian Society of Cardiology (RSC), which regularly update guidelines on main CVDs [9], as well as the state policy focused on reducing cardiovascular morbidity and mortality [10] implemented at various levels, studies of the real-world practice regularly reveal discrepancies between clinical guidelines and routine practice [11–13].

One of the possible approaches for narrowing the gap between the possibilities of modern evidence-based medicine and real-world care provided to patients is to study the process of making clinical decisions by outpatient primary care physicians comprising internists and cardiologists, who bear a significant burden of medical care provision to cardiovascular patients. The present article is the second publication based on the results of such a cross-sectional trial involving outpatient internists, which studied the factors influencing the compliance of decisions taken as part of the treatment of cardiovascular patients with the current RSC guidelines. The previous publication based on the results of this study presented a discussion of the prevalence of burnout and other psychological features in this category of physicians [14].

Material and methods

A cross-sectional study was carried out in 16 public polyclinics in Moscow, which were randomized selected from the complete list of public adult polyclinics provided on the website of the Moscow Department of Health (www.mosgorzdrav.ru). The management of polyclinics (chief physicians and/or chief medical officers) authorized the study, after which district primary care physician, general practitioners, and cardiologists of polyclinics were invited to take part in the study through an anonymous survey.

Inclusion criteria were as follows:

Position held: outpatient primary care physicians (district physicians, general practitioners, cardiologists) engaged in clinical activities at the time of the study and providing professional medical care to patients at high/very high risk of developing CVDs and having CVDs;

- Place of work: public polyclinics in Moscow;
- Signed consent to take part in the study.

Exclusion criteria were:

- a refusal of facility administrators to authorize participation in the study;
- a physician's refusal to take part in the study;
- faulty completion of case report forms and questionnaires, which made their statistical processing impossible.

After signing informed consent, all subjects filled in a case report form containing main social and demographic characteristics (sex, age, education, position) and professional characteristics (specialty, years of employment, postgraduate studies, qualification category). The case report form also included questions concerning a wide range of various factors that could potentially influence clinical decision-making, including the physician's awareness of national clinical guidelines for the prevention and treatment of CVDs; the main sources of medical information; conditions of work;

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attitudes towards non-pharmacological techniques used to correct the main cardiovascular risk factors (RFs); the rationale (s) by which the physician is guided when prescribing drug therapy; psychological aspects of relations with patients and their relatives; whether the physician has a CVD and, if so, how it is controlled. Open questions were also used to assess the level of physicians' awareness of the main cardiovascular RFs.

Subjects also filled in several validated questionnaires in order to permit the assessment of potentially important psychological and quality of life (QoL) characteristics. The presence and level of burnout was assessed using the Maslach Burnout Inventory-Human Services Survey (MBI-HSS) [15]. The questionnaire has three scales: emotional exhaustion (9 statements), depersonalization (5 statements), and personal accomplishment (8 statements). The answers are evaluated by scales from 0 to 6, where 0 corresponds to «never» and 6 corresponds to «every day». Thus, the maximum scores are 54, 30, and 48 points for the emotional exhaustion-, depersonalization-, and personal accomplishment scales, respectively. The greater the score for each scale, the more severe are the different aspects of the burnout syndrome (BOS). For the emotional exhaustion scale, the threshold values were ≤16 and ≤25; for the depersonalization scale – ≤6 and ≤11; for the personal accomplishment scale – ≤30 and ≤37 (low, medium, and high levels, respectively). Anxiety and depressive symptoms were assessed using the Hospital Anxiety and Depression Scale (HADS) [16]. HADS-A (anxiety) and HADS-D (depression) scores of 8–10 corresponded to the presence of symptoms of subclinical anxiety and depressive symptoms, while ≥11 corresponded to clinically severe anxiety and depressive symptoms. The visual analog scale (VAS) from 0 to 10 was used to assess the stress level. The score of ≥ 5 corresponded to the increased level of stress, ≥7 corresponded to high level of stress, while 9–10 corresponded to the highest possible stress. The World Health Organization Quality of Life Brief Version (WHOQOL-BREF) questionnaire, comprising 26 facets, was used to assess physicians' QoL [17]. Following the methodology, the first two facets on QoL and health satisfaction were evaluated separately. The remaining 24 facets were grouped into four domains: Domain 1 – Physical Health, including the following subdomains: pain and discomfort, activities of daily living, energy and fatigue, mobility, sleep and rest; Domain 2 – Psychological and its subdomains: positive and negative feelings; thinking, learning, memory and concentration; self-esteem, bodily image and appearance, religion; Domain 3 – Social relationships and its subdomains: personal relationships, social support, sexual activity; Domain 4 – Environment and its subdomains: financial resources, physical safety and security, health and social care (accessibility and quality), home environment, opportunities for acquiring new information and skills, physical environment, transport.

The results were evaluated using the scale attached to the instructions for the questionnaire, which ranges from 0 to 100: the higher the score, the higher the QoL. The individual decision-making method was studied using the questionnaire «Personality-based factors of decision-making» (LFR-25) introduced by T.V. Kornilova (1994) [18], which consists of 25 statements divided into two subscales («Rationality» and «Risk tolerance in decision-making»). According to the standard instruction for the interpretation of the results of the questionnaire, a subject marked «+1» next to each statement if he/she thought it was mainly characteristic of him/her, «– 1» if it was not, and «0» if the statement characterized him/her only partially. When calculating the «raw» scores, the scores of each subscale were summed up (with the exception of items 7 and 20, which were to be considered with the opposite sign). Then a conclusion was made whether the individual indicator of the respondent was underestimated (made the quarter of the lowest scores), overestimated (made the quarter of the highest scores), or typical of this sample. Percentile scales were also used to more accurately indicate the position of individual data relative to the reference sample.

Physicians participating in the study were asked to submit outpatient case records sequentially within 2–3 working days corresponding to the period of survey of patients admitted with high cardiovascular risk or confirmed CVDs ±1 week. During the analysis of outpatient case records, the following information was taken into consideration:

1. Patient sex and age;
2. Clinical diagnosis made by a physician;
3. Examination ordered to the patient;
4. Drug and non-drug prescriptions given the RFs for CVDs and adverse cardiovascular events registered in the outpatient record, such as hyperlipidemia, smoking, alcohol abuse, stress, arterial hypertension (AH), obesity, diabetes mellitus (DM), or carbohydrate intolerance, insufficient/low

level of physical activity, insufficient vegetable and fruit consumption;

5. Further patient management steps scheduled by the attending physician.

The clinical decisions made by the physician were evaluated along with the quality of the ordered examinations and treatment for patients at high risk of developing CVDs or with CVDs following the RSC clinical guidelines in force at the time of the study [19–23], including the National Guideline for the Prevention of CVDs [19]. Based on the key provisions of these guidelines, a scale developed for each of the existing CVDs and cardiovascular RFs was used to assess the diagnostic examinations, non-pharmacological correction techniques, and drug therapies recommended to the patients. Each match of the physician's prescriptions to the clinical guidelines (in the presence of clinical indications and in the absence of documented contraindications) corresponded to one point. The scores were summed up. Accordingly, the maximum possible score of management compliance with the clinical guidelines was 7 points for AH, 7 points for lipid metabolism disorders, 8 points for DM, 7 points for atrial fibrillation (AF), and 11 points each for stable coronary artery disease (CAD) and chronic heart failure (CHF). Subject surveys and selections of outpatient records were carried out from 2011 to the beginning of 2015.

Statistical analysis of the collected data was carried out in the SAS software suite (Statistical Analysis System, SAS Institute Inc., USA). The mean values and standard deviations (M ± SD) were calculated for quantitative variables measured using an interval scale. The percentage rate of detection or rate of registration of different rank estimates were determined for categorical indicators measured using the nominal scale and ordinal variables measured using the rank scale, respectively. The causality between variables was estimated using contingency tables and calculating the chi-squared test and Cramer's contingency coefficient. Student's T-test was calculated for independent samples in the analysis of intergroup differences measures using the interval scale. The differences between the indicators being compared were statistically significant at $p<0.05$.

In order to assess the correlations between the scores of clinical decision compliance with various relevant RSC guidelines, Spearman correlation analysis was used. Univariate and multivariate regression analysis (binary logistic regression with odds ratio (OR) and 95% confidence interval (CI)) was performed to determine the factors influencing clinical decision-making by physicians. The univariate analysis included indicators with the significance level of $p<0.1$ based on the intergroup comparisons. Indicators with a significance level of $p<0.05$ based on the univariate analysis were used in the multivariate analysis; here, the stepwise variable selection method was used. ROC (receiver operator characteristic) analysis was carried out; for assessing the quality of the multivariate model, area under the curve, threshold, sensitivity, and specificity were calculated.

Results

The study included 108 physicians from 16 outpatient clinics in Moscow from 24 to 70 years old (mean age 44.01 ± 13.06 years; 94 (87.0%) were female and 14 (13.0%) were female); 52% of subjects were 40–65 years old, 15% of subjects were under 40 years, and 6% of subjects over 65 years. The study included 87 (80.6%) primary care physicians, 3 (2.8%) general practitioners, and 18 (16.7%) cardiologists. More detailed social and demographic characteristics of physicians were presented in the previous publication based on this study [14].

The subjects submitted outpatient records of 341 patients with CVDs or at high-risk of adverse cardiovascular events for further analysis; these records corresponded to 203 (59.5%) female patients and 138 (40.5%) male patients. The main demographic and clinical characteristics of the patients are presented in Table 1.

According to the available data, the mean age of patients was 64.4 ± 13.2 years; female patients were on average older than male patients. The majority of patients, both male and female, were 40–65 years old (56.5% and 49.8%, respectively). The following CVDs were diagnosed in patients seeking medical care from the subjects: AH – 92.1%; CAD – 60.7%; exertional angina – 29.9%; CHF – 32.8%; impaired glucose tolerance and DM – 24%; transient ischemic attacks and stroke – 7.3%. Sex-associated differences were only observed for myocardial infarction, which was more common in male patients ($p = 0.009$).

Physicians' prescriptions for patients included in the study were reviewed to determine compliance with the current RSC guidelines by scoring the six clinical guidelines (AH, lipid metabolism disorders, AF, DM, CAD, and CHF) as described above. A percentage of the maximum possible score was then calculated for each clinical guideline. According

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Table 1. Demographic and clinical characteristics of patients with CVDs or at high cardiovascular risk, whose records were submitted for the analysis by the physician subjects

Parameter	Total sample (n = 341)	Female patients (n = 203)	Male patients (n = 138)	p
Age, years (M ± SD)	64.4±13.2	65.9±12.9	62.2±13.3	0.011
Patient age groups, %				
≤ 39 years old	4.1	3.4	5.1	
40–65 years old	52.5	49.8	56.5	0.276
≥ 66 years old	43.4	46.8	38.4	
AH, %	92.1	90.6	94.2	0.232
Grade 1	4.4	6.0	3.1	
Grade 2	63.0	66.8	70.8	0.394
Grade 3	24.6	27.2	26.2	
Stage I	0.3	0	0.7	
Stage II	35.0	39.7	28.5	0.075
Stage III	64.7	60.3	70.8	
Cardiovascular risk, %				
1	7.9	9.4	5.8	
2	5.9	5.9	5.8	0.118
3	19.4	22.7	14.5	
4	66.9	62.1	73.9	
CAD, %	60.7	56.7	66.7	0.063
History of MI, %	23.2	18.2	30.4	0.009
Exertional angina, %	29.9	29.1	31.2	0.678
FC I	2.9	1.7	4.7	
FC II	81.4	78.0	86.0	0.380
FC III	15.7	20.3	9.3	
CABG, %	3.5	2.0	5.8	0.075
PTCA, %	12.6	9.9	16.7	0.063
Coronary artery stenting, %	11.4	9.4	14.5	0.144
Dyslipidemia, %	83.9	85.2	81.9	0.411
IGT, %	2.6	3.0	2.2	0.744
DM, %	21.4	19.2	24.6	0.231
CHF	32.8	31.0	35.0	0.388
Stage I	46.5	54.0	36.7	0.093
Stage IIA	44.6	35.5	57.1	–
Stage IIB	8.9	11.0	6.2	–
Stage III	0	0	0	–
TIA, stroke	7.3	7.4	7.2	0.960

PTCA – or percutaneous transluminal coronary angioplasty; IGT – impaired glucose tolerance; TIA – transient ischemic attack.

to the Spearman analysis, the scores (expressed as the percentage of the maximum possible score) for all clinical guidelines turned out to be significantly correlated, i.e., physicians either complied with the guidelines as a whole or did not follow those documents. The median score was also calculated for the compliance scores with individual clinical guidelines (expressed as the percentage of the maximum possible score), which covered all clinical guidelines applied for the patient. The median was then determined for the entire group of patients, which was 30% [20; 40] %. A subsequently created binary variable took a value of 0 for the median score of compliance with the guidelines >30% and 1 for compliance of ≤30%. This new variable was subjected to univariate regression analysis taking into account the characteristics of the physicians and their patients.

The univariate regression analysis showed that the probability of more accurate compliance with the clinical guidelines (above the median) increased statistically significantly ($p<0.05$) in the presence of certain characteristics of physicians and patients. Concerning the physicians themselves, significant associations were demonstrated for high QoL according to the WHOQOL-BREF questionnaire relating to their satisfaction with health and QoL in general; awareness of clinical guidelines (a physician indicated that he/she had read the RSC guidelines); attendance by the physician at least two educational events (postgraduate courses, study cycles, etc.) within the past 5 years; knowledge of the standards concerning of the cardiovascular RFs; knowledge of their own systolic and diastolic blood pressure; more than a 7-hour working day with internal secondary employment; collaboration with a nurse; high assessment of the conditions of work; perceived support from the facility administrators.

The likelihood of compliance with clinical guidelines was higher in patients with DM, high levels of triglycerides and those receiving metformin or insulin, as well as in cases when outpatient records contained non-pharmacological recommendations (quitting smoking, improved nutrition, reduced salt intake, increased physical activity).

The likelihood of compliance of prescriptions with the RSC clinical guidelines was, conversely, statistically significantly lower in the following cases: the higher attestation category; high levels of burnout as assessed by the Maslach inventory and high indicators of stress according to the VAS; high levels of risk taking according to the LFR-25 questionnaire; professional events (congresses, conferences, etc.) attended less than twice in the past 5 years; materials received from the pharmaceutical companies identified as the sources of professional knowledge; more than a 7.2-hour working day with external secondary employment; completion of documentation taking most of the time of during revisits; complains of interference during interaction with the patient due to lack of time and distractions such as noise; prejudice against new pharmaceutical products; naming lack of drug provision a key factor influencing the decision-making; preference to delegate decision-making to more qualified colleagues.

A lower likelihood of compliance with clinical guidelines among patients was associated with older age; the presence of more severe degrees and stages of AH; a higher estimated risk of adverse cardiovascular events; documented diagnosis of CAD, especially ICD-10 I25.1 (atherosclerotic heart disease); a history of lung diseases, cerebrovascular disorders; such RFs as smoking, obesity, alcohol abuse. The severity of anxiety or depressive symptoms in physicians, as assessed by the HADS scale, was not significantly correlated with compliance with clinical guidelines.

Thus, the compliance of the decisions and prescriptions with the clinical guidelines was influenced by factors associated with the particular physician's professional profile (such as the availability of attestation category, continuing medical education, attendance at professional events, awareness of the clinical guidelines, specific knowledge), his/her psychological status (emotional burnout, level of stress, readiness to take risks) and QoL, attention paid to his/her health (particularly CVD prevention), conditions of work (secondary employment, volume of documents to fill in, lack of time, working environment during visits, nurse's assistance), as well as some prejudices (such as, a cautious approach regarding new drugs or a preference to delegate decision-making to other people). Patient-related factors (mainly age, RF and comorbidity profiles) were also relevant.

Characteristics that were significantly associated with the likelihood of the compliance of prescriptions recorded in the case records with the clinical guidelines were then studied using multivariate regression analysis. Table 2 presents factors associated with higher likelihood of non-compliance of prescribed treatment with the RSC guidelines, while Table 3 provides factors associated with lower

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Table 2. Factors associated with higher probability of the non-compliance of assigned therapy with the RSC guidelines

Parameter	OR	95% CI	p
Physicians			
Higher attestation category	2,56	1,39–4,7	0,002
Attendance of professional events not less than 2 times in the past 5 years	2,23	1,18–4,22	0,013
Part-time secondary employment	15,58	1,51–160,5	0,021
Preference of familiar foreign trade names	2,04	1,08–3,85	0,028
Lack of drug provision as one the main factors influencing decision making according to the physician	5,13	2,69–9,75	<0,001
Emotional exhaustion total score	1,03	1,01–1,06	0,031
Patients			
55 years and older	3,29	1,65–6,55	< 0,001
75 years and older	3,35	1,72–6,52	< 0,001
Alcohol abuse	1,79	1,31–2,43	< 0,001

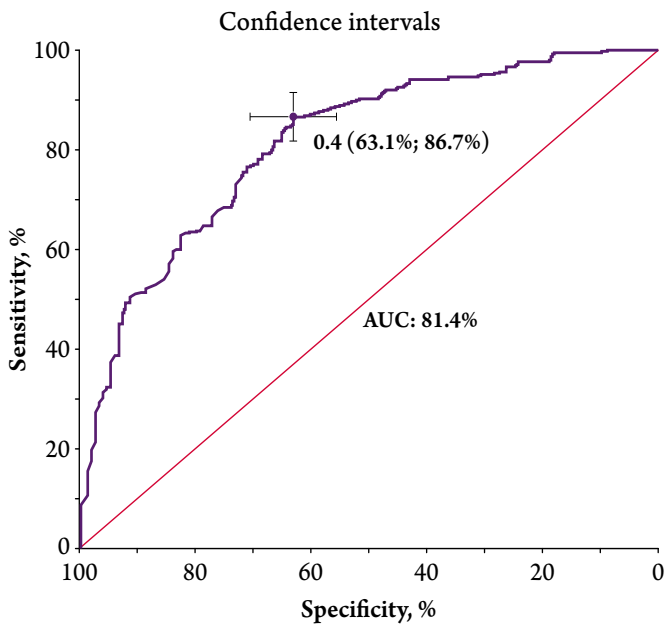
Table 3. Factors associated with lower probability of the non-compliance of prescriptions with the RSC guidelines

Parameter	OR	95% CI	p
Physicians			
«Very satisfied» with his/her health according to WHOQOL-BREF	0,19	0,05–0,72	0,014
Conditions of work as assessed by the physician conditions	0,76	0,64–0,9	0,002
Attendance at postgraduate studies in the past 5 years	0,14	0,06–0,36	< 0,001
Patients			
Metformin administration	0,34	0,14–0,8	0,014
Recommendations for healthy diet in the record	0,06	0,02–0,14	< 0,001
Recommendation to limit salt consumption in the record	0,1	0,01–0,9	0,04
Recommendation to increase physical activity in the record	0,01	0–0,5	< 0,001

likelihood of non-compliance with the guidelines according to multivariate regression analysis.

As shown in Table 2, non-compliance of prescribed treatments with the clinical guidelines was associated with the following factors: physician's higher attestation category; rare attendance at conferences, congresses, and other professional events; external secondary employment; preference for prescribing familiar foreign trade names; perception of problems with drug provision as a significant factor in decision-making, and emotional exhaustion. Non-compliance of prescribed treatments with the clinical guidelines was also associated with a patient's older age and possible alcohol abuse.

Figure 1. Results of ROC analysis for the multivariate model



AUC, area under the curve.

Compliance with clinical guidelines (Table 3) was conversely independently associated with physician's satisfaction with his/her own health, a high evaluation of the conditions of work and attendance of continuing medical education courses in the past 5 years. Moreover, higher compliance with the guidelines was observed in patients receiving metformin, as well as in cases when medical records contained recommendations for non-pharmacological correction of RFs (reduced salt intake, increased physical activity, and improved diet).

In order to evaluate the quality of the multivariate model, a ROC-curve was generated. The ROC-analysis showed high quality of the model: the area

under the curve (AUC) was 81.4%; threshold – 0.4; sensitivity – 86.7%; specificity – 63.1% (Figure 1).

Discussion

We performed a comprehensive analysis of factors associated with the likelihood that the clinical decisions made by physicians, assessed by the prescriptions made in the outpatient records, would correspond or not correspond to the valid clinical guidelines for the treatment of the most common CVDs. Advantages of this study include simultaneous consideration of a wide range of characteristics of physicians and patients, as well as the use of validated questionnaires to assess several key factors available to physicians.

Among the factors associated with a lower likelihood of compliance of the prescriptions made by physicians are rare attendance at professional events, which might have led to the lack of awareness of the relevant clinical guidelines. Conversely, the completion of continuing medical education courses within the previous 5 years reduced the likelihood of low compliance with the guidelines by more than 80%. This is consistent with the findings of a recent meta-analysis [24], in which a lack of knowledge among physicians was identified as one of the most important obstacles to implementing the guidelines. On the contrary, the higher attestation category increasing 2.5-fold the likelihood of non-compliance with the guidelines was unexpected; moreover, given the absence of categorical analogs of the attestation system outside the former Soviet Union, these could not be easily compared with international data. However, if the higher attestation category is regarded as a reflection of significant clinical experience, this fact can be interpreted in terms of inertia of previous experience, which is among the well-known obstacles to complying with clinical guidelines [25]. The role of the preference for familiar trade names can be explained in the same way: this factor also increased two-fold the likelihood of non-compliance with the guidelines. The available meta-analyses [24, 26] also provide evidence for the significant role played by a lack of time, which is to be expected in cases of a more than 7.2-hour workday, as well as a lack of resources, including drug provision. The likelihood of non-compliance of the prescriptions with the clinical guidelines was the least dependent on the subscales of the questionnaire for the diagnosis of professional burnout syndrome, namely, emotional exhaustion. It should be noted that, despite the abundance of signals about a lower quality of care provided by burned-out physicians, the corresponding data are significantly heterogeneous [27, 28]. Moreover, it has been shown [29] that burnout play a greater negative role at the beginning of the physician's career, while it was mainly more experienced physicians who participated in our study.

The factors of non-compliance with the treatment recommendations by patients included their older age (increasing the likelihood more than 3-fold) and alcohol abuse (increasing by almost 1.8-fold). These results were largely expected: elderly patients may have reduced cognitive abilities and thus forget to take the prescribed drugs; they are more dependent on preferential provision of drugs; alcohol abuse also reduces adherence to treatment for obvious reasons. Thus, it is evident that physicians tend not to give recommendations, e.g., for non-pharmacological corrections, as a consequence of keeping outpatient visits to a minimum due to lack of time. Here it should be noted that, although the possibility of insufficient quality of care for elderly patients with various diseases is confirmed in the literature [30], non-compliance with recommendations may also be based on the natural process of withdrawal from previously prescribed drugs due to deterioration of kidney or liver function, the development of senile asthenia, or the onset of new diseases that significantly limit life expectancy [31].

The factors that reduced the likelihood of non-compliance with clinical guidelines in our study included indicators of the physician's well-being, such as satisfaction with health and working conditions. However, it should be noted that the correlation between the well-being of health professionals and the quality of the care provided by them remains insufficiently explored. Thus, the authors of a systematic review of 18 relevant studies [32], while noting the poor overall quality of the cited works and the inconsistency of the data on the technical indicators of quality, not excluding higher satisfaction of patients of specialists who are more satisfied with their well-being. As for the patients analyzed in our study, the likelihood of non-compliance was lower in patients who took metformin and to whom non-pharmacological correction measures were recommended (according to outpatient records). If the use of metformin prescribed in DM and pre-diabetic conditions was apparently considered by the physician subjects as a high-risk marker, the presence of non-pharmacological recommendations in outpatient records could ambivalently affect compliance with

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the recommendations. While, according to the physicians, it may have been the patients who were able to follow such recommendations, the analysis of the corresponding information only from outpatient records did not allow us to characterize these data any more accurately. On the other hand, the degree of compliance of prescriptions with certain guidelines correlated with each other in our study; moreover, physicians who followed the guidelines in terms of non-pharmacological correction of RFs were more likely to follow other guidelines.

The limitations of the present study included the impossibility of extrapolating its results to other categories of physicians. Firstly, despite the random selection of outpatient clinics that were invited to participate in the project, the study was carried out only in facilities whose administrator supported conducting the study; subjects were limited to physicians who gave their consent to participate in the study. Secondly, since middle-aged women significantly predominated in the sample of physician subjects, the results might have been different for male physicians or those belonging to other age groups. Thirdly, it is possible that the factors influencing clinical decision making by physicians working in hospitals may differ from those relevant for outpatient physicians working at the clinics. Fourthly, since this study assessed only the compliance of prescriptions with the RSC guidelines, the identified factors could have been different for compliance with international guidelines and guidelines for other nosologies. Finally, patient data were obtained from the outpatient records rather than during face-to-face interviews.

Conclusion

The study revealed characteristics of physicians and patients associated with the likelihood of compliance of prescriptions made by outpatient physicians with the current national clinical guidelines for the treatment of cardiovascular diseases. These factors included most particularly physicians' access to the educational activities (continuing medical education courses and conferences or congresses), external secondary employment combinations, indicators of previous practice inertia, lack of drug provision, satisfaction with own health, conditions of work, and emotional exhaustion (component of professional burnout). Patient-related factors reducing the likelihood of compliance with the recommendations included older age and alcohol abuse. Thus, given our findings, it makes sense for administrators to create favorable psychological environments in the facility, facilitate off-the-job acquisition of additional knowledge by physicians (e.g., attending scheduled continuing medical education courses and congresses/round tables), as well as taking measures to improve the system of preferential drug provision. A possible promising area may also be the introduction of software tools for conducting medical record-keeping procedures that would assist physicians in conforming with key aspects of applicable guidelines, such as checklists or automated reminders.

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