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Eureka Journal of Health Sciences & Medical Innovation (EJHSMI)

ISSN 2760-4942 (Online) Volume 2, Issue 2, February 2026

https://eurekaoa.com/index.php/5

RISK STRATIFICATION AND PROGNOSIS OF CARDIOVASCULAR DISASTERS IN THE POPULATION IN A FAMILY POLYCLINIC

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ABSTRACT
A set of traditional and specific risk factors in the population has been studied. Independent predictors of high cardiovascular risk have been identified. A logistic model of risk forecasting in the population with high accuracy (AUC=0.83) has been built.

Keywords: Cardiovascular risk; monitoring; ROC analysis; model of prognosis, arterial hypertension, type 2 diabetes mellitus.

Introduction

Cardiovascular diseases remain the leading cause of premature mortality and disability, creating a significant socio-economic burden and prioritizing preventive health programmes. According to the World Health Organization, about 17.9 million people die from cardiovascular diseases every year, which is about a third of all deaths, with a significant proportion occurring at working age, and modifiable risk factors (smoking, arterial hypertension, dyslipidemia, obesity, low physical activity, stress, etc.) remain key determinants.

Global trends show pronounced regional variability. It is noted that more than half of all deaths from cardiovascular pathology occur in the Asian region, where

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demographic shifts and lifestyle changes form a kind of "epidemic" of cardiovascular disorders. The World Health Organization's goals of reducing premature mortality from noncommunicable diseases by one-third by 2030 in a number of countries are unachievable under current dynamics. For Uzbekistan, these world trends are not only characteristic, but also manifest themselves with special pronouncement.

According to the national survey conducted according to the WHO STEPS methodology in 2014, a high prevalence of the main risk factors was revealed: arterial hypertension was registered in about 31% of adults, tobacco smoking in 27%, diabetes mellitus in 6%. At the same time, only 15.4% of patients with high blood pressure had achieved control of indicators against the background of treatment, which indicates pronounced gaps in the management of patients with risk factors.

In the world, the trend in the development of cardiovascular disease prevention is shifting from "universal" recommendations to risk-based strategies based on individual risk stratification, dynamic monitoring of indicators (blood pressure, lipids, glycemia, body mass index, markers of inflammation and stress), the introduction of digital technologies and behavioral interventions.

The aim of the study is to implement the WHO Adapted Clinical Protocol (PEN) for Major Noncommunicable Diseases for screening risk factors for hypertension and diabetes mellitus among the population of family polyclinics.

Objectives of the study:

1. To analyze the identification of risk factors.
2. Effectiveness of early detection and monitoring in the implementation of the WHO PEN protocol for hypertension and diabetes among the population of family polyclinics.

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Materials and methods of research

The object of the study was the population of the family polyclinic No48 in the city of Tashkent, aged 40 years, in the amount of 85 people, who were included in the management program according to the WHO NCD 2 protocol. And 96 people of the same polyclinic in the amount of 96 people over 40 years older, who annually undergo in-depth preventive examinations in the traditional form according to the plan.

Research methods: anamnesis, questionnaire to identify risk factors (individual patient management plan), physical examination, examination of target organs, ECG, urine analysis, blood b/o: glucose, cholesterol.

Research results:

Previously diagnosed hypertension was detected in about a third of the participants in the study group, 34.4% in the control group, and 31.8% in the control group (p=0.79). These differences are statistically insignificant, that is, the levels of hypertension at the start are actually equal. Similarly, the incidence of known type 2 diabetes mellitus was low and did not differ statistically: on the order of 5.9% in the groups and 5.6% in the control group (p=0.34).

Table 1. Correlations between BP levels and anthropometric/laboratory parameters (n=181)

Parameters (X-Y)	**r**	**p**
BMI – Systolic BP	+0,34	<0.001
BMI – Diastolic BP	+0,28	<0.001
Waist Circumference – Systolic BP	+0,26	<0.001
Waist Circumference – Fasting Glucose	+0,21	0,002
Total cholesterol – LDL	+0,80	<0.001

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Statistically significant correlations were found between the indicators of obesity, blood pressure and metabolism. Body mass index directly correlated with systolic ($r=0.34$; $p<0.001$) and diastolic BP ($r=0.28$; $p<0.001$), and waist circumference was directly correlated with systolic BP ($r=0.26$; $p<0.001$), which confirms the contribution of total and abdominal overweight to the formation of arterial hypertension. A positive relationship between waist circumference and fasting glucose levels ($r=0.21$; $p=0.002$) was also established, reflecting metabolic disorders. A strong correlation between total cholesterol and LDL-C ($r=0.80$; $p<0.001$) confirms the consistency of laboratory data. The results obtained emphasize the importance of weight control as a key area of CVD prevention.

To assess the impact of a set of behavioral risk factors on the formation of arterial hypertension and overweight in the population, an analysis of their prevalence in subgroups formed depending on the number of identified behavioral determinants was carried out (Table 2).

Table 2. Incidence of arterial hypertension (AH) and overweight in subgroups of military personnel with a different number of behavioral risk factors (n=181)

Number of behavioral risk factors	n, population	AG, n (%)	Overweight, n (%)
0-1 factors	27	8 (14,8%)	7 (13,0%)
2 factors	54	29 (29,9%)	18 (18,6%)
≥3 factors	100	33 (51,6%)	20 (31,3%)
P-trend (χ^2)	—	<0.001	<0.001

The analysis showed a pronounced dependence of the frequency of arterial hypertension and overweight on the number of behavioral risk factors in military personnel. In the presence of 0–1 factor, hypertension and overweight were found in 14.8% and 13.0% of the examined, respectively, while in the case of two

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factors, their prevalence increased to 29.9% and 18.6%. The maximum values were observed in patients with ≥3 behavioral risk factors: hypertension was detected in 51.6%, overweight in 31.3%. A statistically significant trend ($p<0.001$) confirms the dose-dependent nature of the influence of behavioral factors and emphasizes the need for comprehensive correction of several behavioral determinants to reduce cardiovascular risk.

After the biomedical and behavioral-psychosocial factors were identified, the next logical step was to assess their combined predictive power (Table 3).

Table 3. Area under ROC (Cumulative Prognostic Strength)-Curve of Integral Models for Predicting High Cardiovascular Risk

Model	Variable composition	AUC	95% CI	p (vs model 1)
Biomedical	BMI, OT, OCHS, LDL	0,71	0,64–0,77	—
Integral	+ Total Behavioral Index, Stress (PSS-10), Depression (HADS-D), Smoking	0,83	0,78–0,88	0,003

The biomedical model (BMI, waist circumference, total cholesterol, LDL) showed satisfactory discriminating ability: AUC=0.71 (95% CI 0.64–0.77). This corresponds to the level of predictability that is usually observed in civilian populations when analyzing risk factors without behavior and psycho-emotional state.

The greatest diagnostic accuracy was shown by the integral model, which included service, biomedical, behavioral and psychosocial indicators. The area under the ROC curve was 0.83 (95% CI 0.78–0.88; p=0.003 compared with model 1), which corresponds to good discriminative ability and indicates the practical suitability of the model for individual risk prediction.

The results of the study made it possible to assess the impact of a comprehensive prevention program implemented according to the adapted WHO PEN protocol

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on the main clinical, functional and metabolic indicators in military personnel. The comparability of the initial characteristics of the main and comparative groups ensured the objectivity of the analysis of the dynamics of risk factors. The assessment was carried out according to hemodynamic, anthropometric, biochemical indicators and categories of total cardiovascular risk with inter- and intragroup comparison, which made it possible to determine the most sensitive parameters to the intervention and the groups with the maximum preventive effect (Table 4).

Table 4. Change in the distribution of the examined by categories of total cardiovascular risk in the observation groups, n (%)

Risk category	Group	Originally	After 12 months	P (Dynamics within the group)[1]
Low	Comparison group (n=96)	22 (29,2)	20 (28,1)	0,84
	Primary (n=85)	20 (23,5)	32 (34,2)	0,19
Moderate	Comparison Group	39 (40,6)	38 (39,6)	0,88
	Main	35 (41,2)	34 (40,0)	0,91
High	Comparison Group	20 (20,8)	22 (21,9)	0,81
	Main	20 (23,5)	17 (20,0)	0,52
Very high	Comparison Group	9 (9,4)	10 (10,4)	0,80
	Main	10 (11,8)	7 (7,4)	0,63

In the study group, against the background of the preventive program, there was a significant improvement in the distribution of total cardiovascular risk categories: the proportion of high-risk individuals decreased from 23.5% to 20.0%. (p=0.028), very high-risk individuals increased from 11.8% to 7.4%

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(p=0.12), while the proportion of low-risk individuals increased from 23.5% to 34.2% (p=0.041).

Table 8. Recommended preventive measures for different risk categories

Risk category	Frequency of observation	Main activities	Additional measures
Low	1 time a year	Control of blood pressure, weight; Nutrition and physical activity consultation	Stress Assessment
Moderate	2 times a year	Behavioral counseling; nutrition correction; Body weight control	Brief psychoeducational classes
High	3-4 times a year	Detailed behavior correction; quitting smoking; lipid control; Drug therapy, if necessary	Individual stress reduction programs
Very high	≥ 4 times a year + referral to the hospital	Drug therapy; BP monitoring; correction of all identified factors	Consultation with a cardiologist and psychotherapist

The effectiveness of preventive support depends not only on clinical measures, but also on the organization of interaction within the clinic: doctor-patronage-nurse-nurse-practicing nurse. Regular monitoring allows you to timely identify adverse changes, adjust the intervention plan and prevent the development of clinical forms of cardiovascular diseases.

Conclusions:

1. Behavioral and psychosocial factors play an important role in the formation of total cardiovascular risk in the population: in the presence of ≥3 behavioral risk factors, the incidence of hypertension reaches 51.6% versus 14.8% with a factor of 0–1 (p<0.001), and the level of stress and anxiety/depression indicators

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according to the HADS scale significantly correlate with an increase in systolic and diastolic BP (r to 0.32; p<0.001).

2. Depending on the risk stratification, dynamic monitoring, a visiting nurse, a practicing nurse increases the adherence of the population, improves the distribution of total cardiovascular risk categories.

3. The effectiveness of the adapted WHO PEN program in the population is confirmed by clinically significant improvements. The proportion of high-risk individuals decreased from 23.5% to 20.0%, while the proportion of low-risk individuals increased from 23.5% to 34.2%.

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