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EFFICIENCY OF EDUCATION AT THE SCHOOL OF PREVENTIVE MEDICINE FOR THE PATIENTS WITH ARTERIAL HYPERTENSION EXPOSED TO RADIATION

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Abstract

Introduction: medical counselling promoting healthy lifestyles and behaviour can significantly reduce developmental risk and eliminate the leading causes of hypertension (AH) in the patients exposed to radiation. Adherence to treatment can be enhanced by therapeutic education.

Aim: evaluation the effectiveness of school of preventive medicine for patients with arterial hypertension exposed to radiation.

Methods: During the period 2015-2017 24 cycles of lectures on therapeutic training were conducted on the basis of the rehabilitation centre of the SRI RME within the framework of the organization of a school of health for the patients with hypertension. The study included 403 patients which were divided to main group (202 patients) and control group (202 patients). After 3 months, 6 months and one year, blood pressure, cholesterol, BMI, adherence to therapy, anxiety and depression were monitored. Study design: a controlled clinical trial with historical control. Statistical processing: IBM SPSS Statistics 20.

Results: it was shown a statistically significant increase in adherence to therapy from 6.0 to 11.9% within 6 months after training, a decrease in the proportion of persons with consistently high blood pressure (from 60.8% to 47.2% after 3 months), statistically significant differences of these indicators with those of the control group ($p < 0.05$). Six months after the start of the intervention, there was a statistically significant decrease in symptoms of depression and anxiety, as well as the risk of coronary complications, which were statistically significant differences from the control group.

Conclusion: The need for widespread introduction of such a technology of therapeutic and prophylactic intervention as health schools for AH patients is caused by the importance of timely correction and prevention of AH complications at the level of primary health care.

Keywords: hypertension, school of health, adherence to treatment, anxiety, depression.

Резюме

ЭФФЕКТИВНОСТЬ ОБУЧЕНИЯ В ШКОЛЕ ПРЕВЕНТИВНОЙ МЕДИЦИНЫ ДЛЯ ПАЦИЕНТОВ С АРТЕРИАЛЬНОЙ ГИПЕРТЕНЗИЕЙ, ПОДВЕРГШИХСЯ РАДИАЦИОННОМУ ВОЗДЕЙСТВИЮ

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Введение: медицинское консультирование, направленное на пропаганду здорового образа жизни и поведения, может значительно снизить риски развития и устранить ведущие причины артериальной гипертонии (АГ) у лиц, подвергшихся радиационному воздействию. Приверженность к лечению существенно возрастает при проведении терапевтического обучения.

Цель: оценка эффективности школы превентивной медицины для пациентов с артериальной гипертонией, подвергшихся радиационному воздействию.

Материалы и методы: В течение 2015-2017 гг. в рамках организации школы превентивной медицины для больных АГ было проведено 24 цикла лекций по терапевтическому обучению на базе реабилитационного центра НИИ РМЭ. Исследование включило 403 пациента, из которых 202 вошли в основную группу и 201 в контрольную группу. Через 3 месяца, 6 месяцев и год проводилось мониторингирование АД, уровня холестерина, ИМТ,

приверженности к терапии, уровня тревожности и депрессии. Дизайн исследования: контролируемое клиническое исследование с историческим контролем. Статистическая обработка: IBM SPSS Statistics 20.

Результаты: установлено статистически значимое повышение показателя приверженности к терапии с 6,0 до 11,9% в течение 6 месяцев после обучения, снижение удельного веса лиц со стабильно высоким АД – с 60,8% до 47,2% через 3 месяца, установлены статистически значимые различия этих показателей с показателями контрольной группы ($p < 0,05$). Через шесть месяцев после начала вмешательства наблюдалось статистически значимое уменьшение симптомов депрессии и тревожности, а также риска коронарных осложнений, которые имели статистически значимые различия с контрольной группой.

Заключение: Необходимость широкого внедрения школы превентивной медицины для больных АГ, обусловлена важностью своевременной коррекции и профилактики осложнений АГ на уровне первичного звена здравоохранения.

Ключевые слова: гипертензия, школа здоровья, приверженность к лечению, тревога, депрессия.

Түйіндеме

РАДИАЦИЯЛЫҚ ӘСЕРГЕ ҰШЫРАҒАН АРТЕРИЯЛЫҚ ГИПЕРТЕНЗИЯСЫ БАР ПАЦИЕНТТЕРГЕ АРНАЛҒАН ПРЕВЕНТИВТІ МЕДИЦИНА МЕКТЕБІНДЕ ОҚЫТУ ТИІМДІЛІГІ

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Кіріспе: салауатты өмір мен мінез-құлық салтын насихаттауға бағытталған медициналық консультация беру радиациялық әсерге ұшыраған адамдарда артериялық гипертензияның (АГ) даму қауіптерін едәуір төмендетіп, оның жетекші себептерін жоя алады. Емдеуге бейілділік терапиялық оқытуды жүргізу кезінде айтарлықтай жоғарлайды.

Мақсаты: радиациялық әсерге ұшыраған артериялық гипертензиясы бар пациенттерге арналған превентивті медицина мектебінің тиімділігін бағалау.

Материалдар және әдістер: 2015-2017 жылдардың ішінде АГ-ға шалдыққан науқастарға арналған превентивті медицина мектебін ұйымдастыру аясында РМЭ ҒЗИ-дың оңалту орталығы базасында терапиялық оқыту бойынша 24 дәріс циклы өткізілді. Зерттеу 403 пациентті қамтыды, оның 202-сі негізгі топқа және 201-і бақылау тобына енді. 3 ай, 6 ай және бір жылдан кейін АҚ-ға, холестерин деңгейіне, ДМИ-не, емдеуге бейілділігіне, мазасыздану мен күйзеліс деңгейіне мониторинг жүргізілді. Зерттеу дизайны: тарихи бақылау жүргізілетін бақыланатын клиникалық зерттеу. Статистикалық өңдеу: IBM SPSS Statistics 20.

Нәтижелер: сәулеленуден кейін 6 айдың ішінде емдеуге бейілділік көрсеткішінің статистикалық тұрғыда 6,0-ден 11,9%-ке дейін едәуір жоғарлауы, тұрақты түрде жоғары АҚ-ы бар адамдардың үлес салмағының 3 айдан соң 60,8%-тен 47,2%-ке дейін төмендеуі белгіленді, осы көрсеткіштердің бақылау тобының көрсеткіштерінен статистикалық тұрғыда маңызды айырмашылықтары белгіленді ($p < 0,05$). Араласу басталғаннан кейін алты айдан соң күйзеліс пен мазасыздану белгілерінің, сондай-ақ бақылау тобынан статистикалық маңызды айырмашылықтары болған коронарлық асқынулар қаупінің статистикалық тұрғыда айтарлықтай төмендеуі байқалды.

Қорытынды: АГ-ға шалдыққан науқастарға арналған превентивті медицина мектебін кеңінен енгізу қажеттілігі денсаулық сақтау саласының бастапқы буын деңгейінде АГ-ны уақытында түзету және асқынуларын алдын алу маңыздылығына негізделген.

Түйін сөздер: гипертензия, денсаулық мектебі, емдеуге бейілділік, мазасыздық, күйзеліс.

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Introduction

Arterial hypertension (AH) is one of the most relevant problems in modern medicine around the world. In Kazakhstan, AH affects from 27 to 35% of the adult population, and its prevalence rate in 2016 was 1,231.7 per 100,000 populations; among women, these indicators consistently exceed those among men. In the East Kazakhstan region, the prevalence of hypertension is higher than the national average - 1338.0 per 100,000 populations [4].

It is known that medical counselling aimed at promoting a healthy lifestyle and behaviour can significantly reduce the risks of development and eliminate the leading causes of major socially significant diseases, which include arterial hypertension [37]. According to the recommendations of the US Preventive Services Task Force, behavioural counselling interventions at the primary health care level are an important part of the recommendations for preventive services in the clinic [31].

Currently, in the treatment of patients with hypertension, one of their successful technologies is therapeutic education that can correct and minimize modifiable risk factors for diseases of the circulatory system, which include physical inactivity, stress, hypercholesterolemia, excessive salt consumption, overweight, smoking, and other bad habits [23, 38, 17, 19, 27, 22]. Therefore, measures aimed at controlling these factors can significantly improve both the physical and psychological state of patients, reduce the number of antihypertensive drugs used, which determines the prognosis of the course of hypertension and its complications [13, 12]. This work is hampered due to the poor awareness of the population about the state of their health, correct lifestyle, low adherence to treatment, and insufficient contact with their attending physician. Therefore, in recent decades, schools of arterial hypertension have been actively introduced throughout the world at the level of primary medical and social care; their tasks include teaching patients to control blood pressure (BP), regular use of antihypertensive drugs, and the formation of correct dietary habits, active lifestyle, methods of smoking cessation and alcohol intake [15, 33, 20, 39].

It has been found that adherence to treatment significantly increases after therapeutic training, however, over time, the positive effect of such intervention decreases, which necessitates continuous long-term monitoring and correction of results. For this, additional measures are being introduced, such as special thematic cycles with the involvement of specialists of various profiles - endocrinologists, nutritionists, psychotherapists, etc., which provides a differentiated, individual approach to treating patients and increasing their motivation to control hypertension [6, 7, 8, 9, 10, 21].

The effectiveness of treatment for arterial hypertension varies widely in different patients; it depends not only on the severity of the disease, age and concomitant pathology, aggravating the course of the underlying disease, but also on socio-economic factors, psychological state of patients and their relationship to the disease. The severity of a patient status with a cardiovascular disease often depends on the presence of concomitant chronic or acute depression or anxiety, which occurs in approximately 20% of such patients. Depression reduces adherence to drug therapy,

inhibits behaviour change and healthy lifestyles, and increases the risk of patients abandoning cardiac rehabilitation, affecting their quality of life. Therefore, identifying patients with high risk of developing depression and providing them medical advice is of paramount importance in clinical practice [40, 18, 11, 16].

A study of the role of self-control in the relationship between depression and adherence to treatment among elderly patients with hypertension showed that self-control partially mediated the link between depression and adherence to drug therapy. Interventions to manage self-management and reduce depression can improve patients' ability to take medications more actively. Moreover, healthcare providers should be aware of the importance of early detection of depression in elderly patients with hypertension [35].

For residents of the East Kazakhstan region, an additional risk factor for the development of cardiovascular diseases is a long-term stress effect associated with living in territories exposed to radioactive contamination as result of nuclear weapons tests at the Semipalatinsk nuclear test site. Previous studies have shown that the prevalence of hypertension in the people exposed to radiation is higher than among the unexposed population [30, 25], which may be associated with higher levels of anxiety and depression in these people [26, 29]. In turn, the unsatisfactory psychological state leads to a decrease in the adherence of these patients to antihypertensive therapy [24].

The aim of this study is evaluation the effectiveness of school of preventive medicine for patients with arterial hypertension exposed to radiation.

Methods

During 2015-2017 to conduct training for patients with hypertension, we organized and implemented a School of preventive medicine on the basis of the Rehabilitation Center of the Research Institute for Radiation Medicine and Ecology. In total, we conducted twenty-four cycles of lectures; each lecture included the following information:

- about the mechanisms of development and risk factors of hypertension, clinical symptoms, the method of measuring and monitoring blood pressure (BP) at home, methods of treatment with antihypertensive drugs;
- about ways to control body weight, the formation of correct dietary habits, rational nutrition (DASH diet), the positive role of trace elements, antioxidants and vitamins in the prevention and treatment of hypertension;
- about methods of controlling stressful situations, positive thinking and levelling of psycho-traumatic factors, methods of meditation;
- about the need for sufficient physical activity, physiotherapy exercises, contributing to a gradual decrease in blood pressure, methods of quitting smoking and alcohol taking;
- about the current radiation situation in the areas of patients residence, problems of radioecology and radiation safety, ways to overcome the negative consequences of radiation exposure, about the rights, benefits and compensations, about the results of State targeted programs aimed at specialized diagnostics, treatment and prevention of diseases associated with radiation exposure.

The listeners of the lectures were the patients with AH living in areas of the East Kazakhstan region exposed to

radiation in the range of effective equivalent doses of 50-250 mSv, which was confirmed by the presence of a "polygon certificate" and the presence of information about the patient and his effective equivalent dose of radiation in State scientific automated medical register of the population exposed to radiation. During the study period, 657 patients were treated in the rehabilitation center, of which 403 (61.4%) agreed to participate in the study program. These individuals were subsequently divided into the main study group included 202 patients who received training, and a control group of 201 patients.

Before the start of the training course we defined the level of knowledge of patients about the criteria for normal BP and blood cholesterol, about risk factors for hypertension, observing the rules of a healthy diet and an active lifestyle, smoking, the regularity of using antihypertensive drugs, the level of education, the body mass index (BMI). Persons leading a sedentary lifestyle for more than 5 hours a day were considered as physically inactive ones.

The assessment of adherence to therapy was carried out using a questionnaire on adherence to the treatment of arterial hypertension (Morisky Medication Adherence Scale-4, MMAS-4) [32]. The hospital scale of anxiety and depression HADS (The hospital Anxiety and Depression Scale Zigmond A.S., Snaith R.P.) was developed for the primary detection and assessment of the severity of both depression (HADS-D) and anxiety (HADS-A) in general medical practice [34]. The Spielberg anxiety test (State-Trait Anxiety Inventory - STAI) is a reliable and informative way to self-assess the level of situational anxiety at the moment (reactive anxiety as a state) and personal anxiety (as a stable characteristic of a person) [36]. To determine the total coronary risk, we used the HeartScore® computer program (electronic analogue of the paper version of the European SCORE scale (Systematic Coronary Risk Evaluation)). The program is a unique interactive tool for predicting the risk of death from BSC and its correction.

Monitoring of the adherence of trained patients to the correct lifestyle, nutrition and treatment was carried out using the telephone or the Internet for every month. After 3 months, 6 months, and one year after completing the training, patients were invited to monitor BP, cholesterol levels, BMI, adherence to therapy, anxiety and depression levels. The study was approved by the Ethics Committee of the Semey Medical University (protocol No. 4 dated October 14, 2015). Prior to the study, all researchers received training on interviewing and patient examination techniques. The participants were interviewed using the face-to-face method. Study design: a controlled clinical study.

Statistical processing: IBM SPSS Statistics 20, with the determination of the normality of the distribution of the studied characteristics and the assessment of descriptive statistics of numerical variables. Qualitative variables are presented as absolute numbers and their percentages. The assessment of differences in groups was determined by calculating the χ^2 criterion.

Results

Females represented the majority of patients in both the main and control groups (70.5% and 74.6%, respectively), which was due to a higher response of women to the offer to participate in the study. The average age of the study participants in the main group was 57.6 years, in the control group it was 56.9 years. The vast majority of individuals in the study groups (85.1%) were exposed to radiation doses below 60 mSv. Most of the people had a school or specialized secondary education (73.5% in the main group and 71.5% in the control group). The vast majority of patients in both study groups were exposed to radiation in the range of low radiation doses (up to 200 mSv). The characteristics of the main and control groups of the study are presented in Table 1. We can see the absence of statistically significant differences in the study groups before the start of therapeutic training.

Table 1.

Characteristics of patients with hypertension, trained at the school of preventive medicine.

Characteristics		The main group (n=202)		Control group (n=201)	
		n	%	n	%
Sex	Female	142	70,5	150	74,6
	Male	60	29,5	51	25,4
Age	40-59	105	52,0	99	49,25
	60+	97	48,0	102	50,75
Education	School	81	40,0	72	35,8
	Specialized secondary	68	33,5	71	35,3
	Higher	53	26,5	58	28,85
Dose of exposition (mSv)	<20	85	42,0	85	42,3
	20-59	86	42,6	84	41,8
	60-185	29	14,4	31	15,4
	186≥	2	1,0	1	0,5

The average BMI for men in the main group was 29.8 ± 5.135, for women it was 32.32 ± 7.4, in the control group these indicators were 29.6 ± 7.115 and 32.40 ± 6.9, respectively, and did not have statistically significant differences with the rates of the main study group.

The results of evaluating the effectiveness of the training program after 3, 6 months and 1 year after training are shown in Table 2. A statistically significant increase in

adherence to drug treatment in the main group was established during 6-month follow-up from 6.0 to 11.9%, after a year this indicator slightly decreased (10.4%), however, it retained statistically significant differences with those of the control group (p <0.01). The percentage of patients with non-adherence to treatment steadily decreased by the follow-up period of one year from 77.42% to 56.9%, while in the control group this indicator remained

almost at the initial level (76.6% and 74.1 %, respectively) (p <0.05 three months after the start of training, p <0.01 6 months and a one year after training). The indicator of

complete non-adherence to treatment in the main study group decreased due to an increase in the proportion of individuals with insufficient adherence to treatment.

Table 2.

Indicators of the effectiveness of therapeutic education in the school of preventive medicine.

Rates		Initial level		In 3 months		In 6 months		In one year	
		Main group n (%)	Control n (%)	Main group n (%)	Control n (%)	Main group n (%)	Control n (%)	Main group n (%)	Control n (%)
Dynamics of BP decrease	yes	79 (39,2)	76 (37,8)	102 (50,5**)	84 (41,7)	111 (54,9**)	83 (41,3)	97 (48*)	78 (38,8)
	no	123 (60,8)	125 (62,2)	100 (49,5)	117 (58,3)	91 (45,1)	118 (58,7)	105 (52*)	123 (61,2)
BMI	<25	43 (21,3)	41 (20,4)	43 (21,3)	41 (20,4)	42 (20,8)	40 (19,9)	42 (20,8)	40 (19,9)
	25-29	48 (24,6)	49 (24,4)	62 (30,7)	54 (26,9)	66 (32,7)	54 (26,9)	65 (32,2)	52 (25,9)
	>30	111 (54,1)	111 (55,2)	97 (48,0)	106 (52,7)	94 (46,5*)	107 (53,2)	95 (47,0*)	109 (54,2)
Total cholesterol	<5,3 mmol/l	84 (41,7)	86 (42,8)	97 (48,0)	89 (44,3)	99 (49,0)	87 (43,3)	103 (51,0)	88 (43,8)
	Hypercholesterolemia	118 (58,3)	115 (57,2)	105 (52,0)	112 (55,7)	103 (51,0)	114 (56,7)	99 (49,0)	113 (56,2)
Smoking	no	159 (78,9)	155 (77,1)	165 (81,7)	158 (78,6)	168 (83,0)	159 (79,1)	164 (81,2)	159 (79,1)
	yes	43 (21,1)	46 (22,9)	37 (18,3)	43 (21,4)	34 (17,0*)	42 (20,9)	38 (18,8)	42 (20,9)
Physical activity	Active	88 (43,6)	91 (45,3)	100 (49,5)	96 (47,8)	104 (51,5*)	95 (47,3)	101 (50,0*)	93 (46,3)
	Inactive	114 (56,4)	110 (54,7)	102 (50,5)	105 (52,2)	98 (48,5)	106 (52,7)	101(50,0)	108 (53,7)
MMAS-4	Adherents to therapy	12 (6,0)	14 (7,0)	19 (9,4*)	16 (7,9)	24 (11,9**)	17 (8,5)	21 (10,4**)	15 (7,5)
	Insufficiently committed	34 (16,8)	33 (16,4)	62 (30,7*)	43 (21,5)	59 (29,2**)	37 (18,4)	66 (32,7**)	37 (18,4)
	Not committed	156 (77,2)	154 (76,6)	121 (59,9*)	142 (70,6)	119 (58,9**)	147 (73,1)	115 (56,9**)	149 (74,1)
HADS-A	No symptoms of anxiety	87 (43,0)	85 (42,3)	95 (47,0)	87 (43,3)	99 (49,0*)	89 (44,3)	103 (51,0*)	86 (42,8)
	Subclinical anxiety	93 (46,0)	93 (46,3)	89 (44,1)	93 (46,3)	87 (43,0*)	92 (45,8)	81 (40,1*)	94 (46,8)
	Clinically pronounced anxiety	22 (11,0)	23 (11,4)	18 (8,9)	21 (10,4)	16 (8,0*)	20 (9,9)	18 (8,9*)	21 (10,4)
HADS-D	No symptoms of depression	95 (47,0)	90 (44,8)	113(55,9*)	94 (46,8)	122 (60,4**)	98 (48,8)	127 (62,9**)	95 (47,3)
	Subclinically severe depression	63 (31,2)	69 (34,3)	55 (27,3*)	68 (33,8)	48 (23,8**)	66 (32,8)	44 (21,8**)	66 (32,8)
	Clinically significant depression	44 (21,8)	42 (20,9)	34 (16,8*)	39 (19,4)	32 (15,8**)	37 (18,4)	31 (15,3**)	40 (19,9)
STAI - Situational	Very low anxiety	4 (1,9)	5 (2,5)	5 (2,47*)	6 (3,0)	8 (4,0)	8 (4,0)	8 (3,9**)	6 (3,0)
	Low anxiety	56 (27,7)	53 (26,3)	89 (44,1)	59 (29,3)	85 (42,0**)	61 (30,3)	81 (40,1**)	58 (28,8)
	Average anxiety	129 (63,8)	131 (64,8)	98 (48,5)	126 (62,7)	101(50,0**)	121 (60,2)	104 (51,5**)	127 (63,2)
	High anxiety	6 (3,0)	7 (3,5)	5 (2,47*)	6 (3,0)	4 (2,0*)	6 (3,0)	5 (2,5)	6 (3,0)
	Very high anxiety	7 (3,6)	6 (2,9)	5 (2,47*)	4 (2,0)	4 (2,0*)	5 (2,5)	4 (2,0*)	4 (2,0)
STAI - Personal	Very low anxiety	2 (1,0)	2 (1,0)	3 (1,5)	3 (1,5)	4 (2,0*)	4 (2,0)	6 (3,0**)	4 (2,0)
	Low anxiety	23 (11,4)	25 (12,4)	72 (35,6**)	33 (16,4)	81 (40,1**)	36 (18,0)	87 (43,1**)	32 (15,9)
	Average anxiety	137 (67,8)	135 (67,1)	98 (48,5*)	132 (65,7)	98 (48,5**)	130 (64,7)	93 (46,0**)	131 (65,2)
	High anxiety	36 (17,8)	34 (16,9)	27 (13,4**)	29 (14,4)	19 (9,4**)	27 (13,3)	16 (7,9*)	31 (15,4)
	Very high anxiety	4 (2,0)	5 (2,6)	2 (1,0)	4 (2,0)	0	4 (2,0)	0	3 (1,5)

MMAS-4-Morisky Medication Adherence Scale-4;

HADS - The hospital Anxiety and Depression;

STAI-State-Trait Anxiety Inventory;

* - p<0,05; ** - p< 0,01

An increase in adherence to treatment in the main study group was accompanied by a reduction in the proportion of patients in whom it was not possible to achieve a persistent decrease in blood pressure, from 60.8% at the start of training to 49.5% after 3 months, while

in the control group this indicator also tended to decrease, but less pronounced than in the main group (62.2% and 58.3%, respectively after 3 months), the differences in the study groups were statistically significant (p <0.05) (Figure 1).

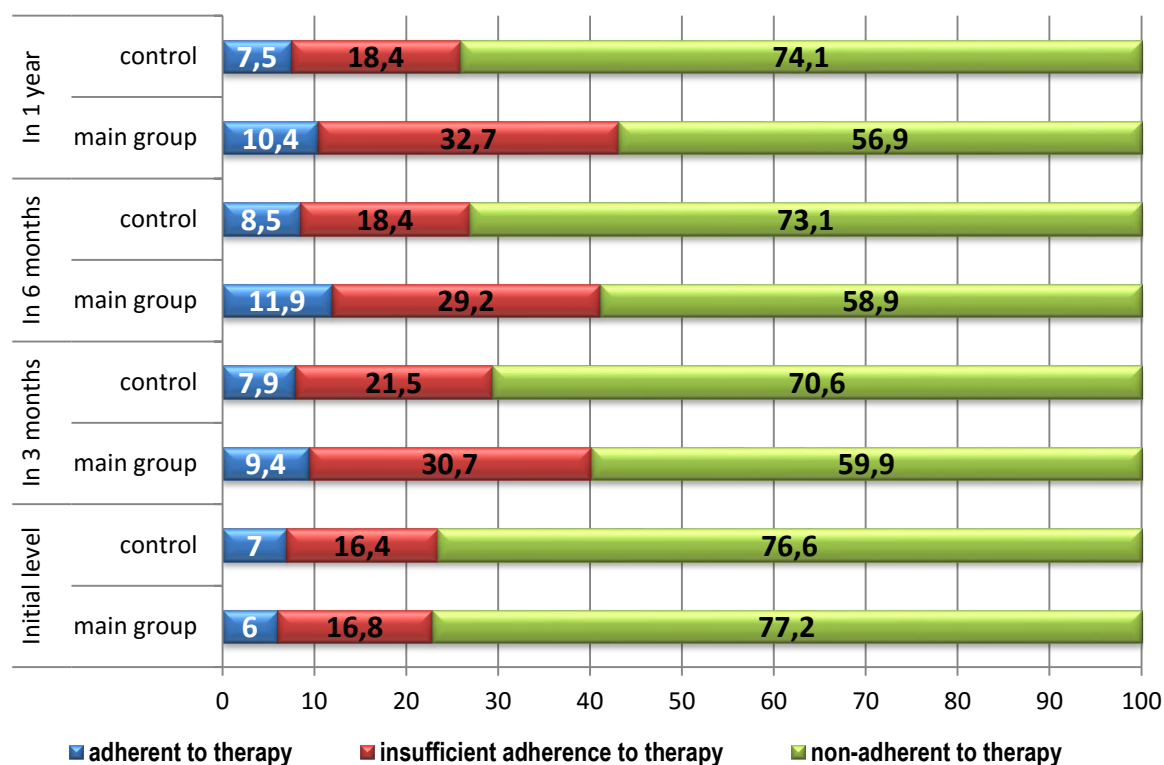


Figure 1 - Dynamics of indicators of the effectiveness of therapeutic education in the school of preventive medicine in relation to adherence to antihypertensive therapy in the main and control groups (%)

After 6 months, the indicator of decrease in BP in the main group reduced to 45.1%, while in the control group it was 58.7% ($p < 0.05$). In the subsequent period of observation, the indicator tended to increase in both study groups, however, statistically significant differences between them remained ($p < 0.05$). Before the start of training, BP decreased in the main group only in 39.2%, then after six months a significant decrease in BP was found in 54.9%, which can be explained by a simultaneous increase in adherence to drug therapy and a healthy lifestyle; however at the end of the observation period, the indicator slightly decreased - 48.0%, while statistically significant differences with the control indicators remained ($p < 0.01$).

The BMI indicator in the main study group also tended to decrease; there was a small but statistically significant decrease in the number of patients with severe obesity (54.1% before the start of training compared to 46.5% after 6 months and 47.0% after one year of observation), while in the control group the indicator did not have significant changes in comparison with the initial level. There were statistically significant differences in the indicator in the main and control groups of the study 6 and 12 months after training ($p < 0.05$). The average prevalence of hypercholesteremia in the patients of the main group also showed a downward trend (Table 2).

Physical activity increased during the first half of the year after training in 7.8% of patients in the main group, but by the end of the observation period, their number again decreased to 6.4%. There were no statistically significant differences with the control group. The proportion of active

smokers among the trained patients after six months of monitoring decreased from 21.1 to 17.0, however, a year after the start of training, this indicator again increased to 20.9% ($p < 0.05$). There were no statistically significant differences with the control values for the entire observation period.

Evaluation of indicators characterizing the psychological state in the main group showed their pronounced positive dynamics throughout the entire period of the study. According to the survey data on the HADS-A scale, symptoms of clinically severe anxiety after graduation were detected in 8.9% of individuals compared to 11.0% before training, and subclinical severe anxiety - in 40.1%, while as before training, they were determined in 46.0% of patients ($p < 0.05$; $p < 0.05$, respectively). Symptoms of subclinical and clinically pronounced depression showed a definite tendency to decrease in the main group. Thus, six months after the start of the intervention, a statistically significant decrease in symptoms was observed, which remained stable by the end of the monitoring period and had statistically significant differences with the control group ($p < 0.01$; $p < 0.01$, respectively).

With regard to the symptoms of situational and personal anxiety, their pronounced decrease in the main group of the study was established, starting from a period of 3 months after training; the indicators remained statistically significantly lower than the control values throughout the entire study period ($p < 0.05$ after 3 months, $p < 0.01$ after 6 and 12 months). Situational or reactive anxiety of low degree one year after training was observed in 40.1% of patients compared with 27.7% before the intervention and

28.8% in the control. At the same time, indicators of anxiety of a very high, high and medium degree showed a tendency to decrease. The same situation developed with regard to personal anxiety. There was a marked decrease in the indicators of moderate anxiety from 67.8% to 46.0%. Throughout the study, the indicators of the main and control groups had statistically significant differences ($p < 0.01$) (Table 2).

Rates of systolic and diastolic BP in the patients of the main group in dynamics significantly decreased, while after 6 months statistically significant differences in indicators of the main and control groups were established, by the end of the study the indicators of the main group slightly increased, but the differences remained statistically significant ($p < 0.05$) (Table 3).

Table 3.

Dynamics of blood pressure indicators in patients with AH at baseline and 3, 6 months and 1 year after training.

Indicator	Before training	After 3 months	After 6 months	After 1 year
The main group				
Systolic BP (M±m, mm Hg)	156,6±4,6	149,3±6,5	145,4±5,1*	146,1±5,6*
Diastolic BP (M±m, mm Hg)	96,7±6,7	92,8±5,8	88,3±5,7*	90±5,4*
The control group				
Systolic BP (M±m, mm Hg)	152,6±4,9	150,3±5,5	149,2±5,3	149,7±5,5
Diastolic BP (M±m, mm Hg)	97,6±6,9	96,4±5,5	95,9±5,2	94,8±5,1

*- $p < 0,05$

The assessment of the 10-year risk of developing cardiovascular diseases, their complications and mortality from cardiovascular pathology in general in hypertensive patients over a year after the training was carried out using the HeartScore® computer program. The following indicators were taken into account: level of systolic BP, total cholesterol and high-density lipoproteins, the presence of a smoking factor, gender and age of the patient, and BMI. In general, the training provided showed a fairly high

efficiency. So, at the initial moment of the study, high risk of coronary complications was identified in 18.3% of patients, during the year it steadily decreased and amounted to 9.1% by the end of the observation. The same dynamics was observed in relation to moderately high risk (before training, the indicator was 55.7%; by the end of the observation period, it dropped to 23.4%). After 6 and 12 months, statistically significant differences were observed in the main and control groups of the study ($p < 0.01$) (Figure 2).

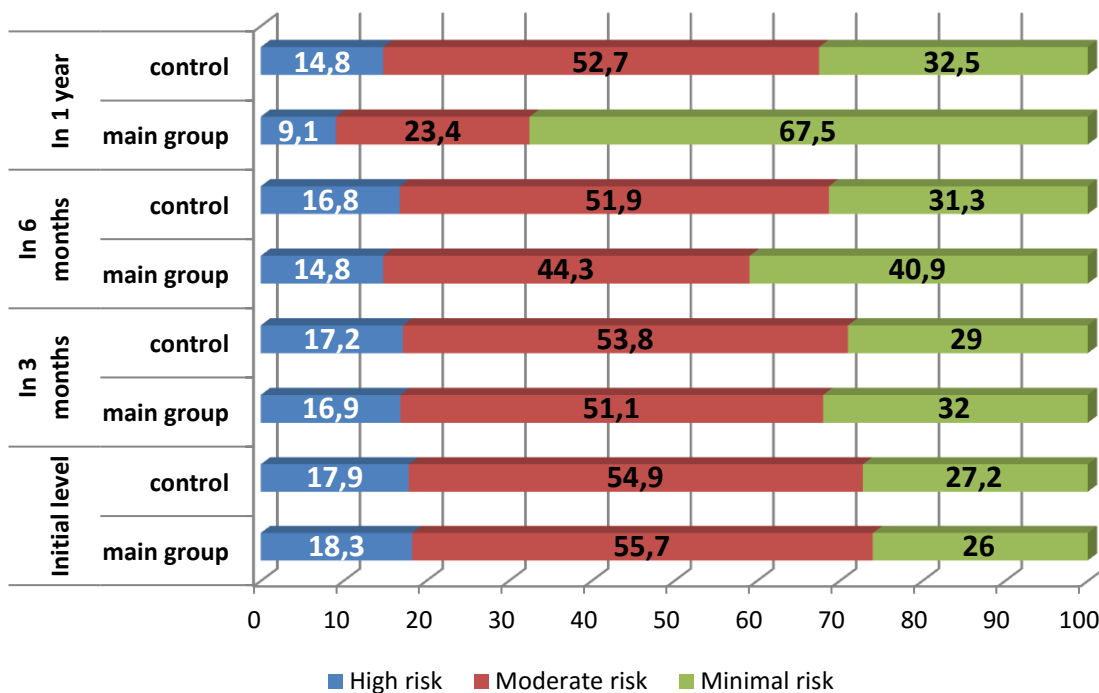


Figure 2. - Dynamics of coronary risk according to the SCORE scale in the study groups (%).

Discussion

The results of our study demonstrate high efficiency of preventive therapeutic education among patients with hypertension living in conditions of environmental disadvantage. During the study period, we found a statistically significant decrease in systolic and diastolic BP, total cholesterol, the proportion of patients with signs of

clinically severe anxiety and depression, situational and personal anxiety. It was of considerable interest for us to compare the results of our study with the data of similar studies available in the literature.

In a systematic review of the evidence for the effectiveness of behavioural counselling interventions for the prevention of cardiovascular diseases, which included

57 randomized clinical trials, a decrease in morbidity rates over 10 years has been shown, but these interventions did not affect mortality rates from diseases of the circulatory system. Results from only one study in Swedish men at high risk of cardiovascular disease indicated that behavioural counselling combined with drug monitoring reduced the age of onset of circulatory system diseases by 6.6 years compared with those without such counselling (relative risk 0.71 [95% CI, 0.51-0.99]). At the same time, combined counselling led to a significant reduction in total cholesterol, low-density lipoprotein cholesterol, BP, fasting glucose, diabetes incidence and body mass index. Overall, after 12-24 months, behavioural counselling reduced total cholesterol by an average of 4.48 mg / dL (95% CI 6.36 - 2.59), LDL cholesterol by 3.43 mg / dL (95% CI 5.37-1.49), systolic blood pressure by 2.03 mm Hg. Art. (95% CI 2.91-1.15), diastolic blood pressure at 1.38 mm Hg. (95% CI 1.92-0.84). There was a statistically significant improvement in physical activity [28].

Despite the close relationship between depression and the pathology of the circulatory system, the question of screening for depression is still controversial. The DEPSCREEN-INFO study found that in hypertensive patients who receive feedback and recommendations for treatment in addition to screening, depression levels tend to decrease within six months after screening, while improving quality of life and reducing costs associated with treatment [11].

According to Naumova M.A. et al (2006), the group method of teaching has a number of advantages over the individual one, since it makes it possible to simultaneously train a sufficiently large number of patients, while they have the opportunity to communicate with each other, share their treatment experience, demonstrate the positive effects of treatment on the example of individual patients group as a whole. Participation in such therapeutic group learning leads to increased motivation for treatment, a healthy lifestyle, and a decrease in anxiety and depression. High awareness of patients about their disease, the principles of treatment, the need for rational nutrition and physical activity, dispensary observation can significantly improve the quality of life of people, prevent complications of the disease, reduce the economic losses of the state associated with the cost of drug treatment [3]. Non-drug correction of risk factors is an effective way to control hypertension. The high efficiency of the educational program of schools of health allows us to recommend it for widespread use in patients with hypertension [5]. Achievement of target BP values or a significant decrease in BP values in relation to baseline leads to a decrease in the risk of coronary complications and the level of the average 10-year risk of fatal cardiovascular events, as determined by the SCORE scale [1].

In a study of Kazakh scientists conducted in 2014, it was shown that arterial hypertension is characterized by a decrease in quality of life indicators according to a survey of patients using the SF-36 scale, and there is a direct correlation between the degree of hypertension and a decrease in the quality of life. An educational program for hypertensive patients within the School of Health makes it possible to significantly improve the quality of life indicators, at least for up to 6 months after its completion [2]. Analysis

of literature data indicates a high comparability of the results of our study with studies of both domestic and foreign studies.

Conclusion

The need for widespread implementation of such a technology of therapeutic and prophylactic intervention as School of preventive medicine for patients with hypertension is due to the importance of timely correction and prevention of complications of hypertension at the level of primary health care, since therapists and general practitioners are the first to face the issues of diagnosing the treatment of this disease. Conducting therapeutic training allows, in addition to directly reducing blood pressure level, to significantly increase patient adherence to drug treatment, establish trust and good contact with the attending physician, reduce the level of anxiety and depression in the patient, and also contributes to a reasonable choice of a rational way to spend financial resources.

The authors declare no conflicts of interest.

Authors' contributions:

Pivina L.M. - corresponding author,

Dyusenova L.B. - development of the research concept,

Belikhina T.I. - search and selection of articles for inclusion in the review,

Zhunosova T. - general management.

The results of this study are published for the first time. This study is an initiative.

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