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RESULTS OF THE INTEGRATED ASSESSMENT OF THE POTENTIAL OF LIFESTYLE OF PATIENTS WITH ARTERIAL HYPERTENSION WITH DIFFERENT LEVEL OF TREATMENT PERFORMANCE

Abstract

Introduction. Hypertension is one of the most serious problems of the modern health care. Within the qualimetric approach the quantification of "lifestyle potential" is also provided. However, there are not enough studies examining the relationship between the cardiac health care effectiveness and the lifestyle of patients with hypertension. **The objective** was to study the lifestyle potential of patients with hypertension and its role in the ensuring the treatment effectiveness. **Materials and methods.** The study was conducted on the basis of the medical institutions of the Kostroma region. Research methods were: expert, sociological, analytical, and statistical. Data on 400 cardiac patients, lifestyle parameters monitoring using the original automated program Management of Performance Factors for Cardiac Medical Care data, expert evaluation of patient's lifestyle and the sociological survey data according to the questionnaire, consisting of 8 questions, were analyzed. **Results and discussion.** Patients with hypertension has reduced lifestyle potential in all its components, including the low medical activity, low medical awareness, insufficient level of recreational activity, disregard for the principles of rational nutrition, and the prevalence of bad habits. There are significant differences in the lifestyle potential of patients with low and high levels of treatment success proving the importance of modifying the lifestyle of patients and its improvement in the practice of primary care physicians. **Conclusions and proposals.** It is recommended to monitor the lifestyle potential of patients with hypertension in conditions of district out-patient departments.

Key words: *hypertension, lifestyle, effectiveness of treatment*

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Introduction

Hypertension is one of the major problems of modern health care due to the high prevalence of the disease and the development of its complications [4]. According to experts, elevated blood pressure is recorded in one in four adults in developed countries [2, 9, 10, 11]. In Russia, direct and indirect financial losses due to the treatment of complications of hypertension amount to 30 billion rubles per year and are constantly increasing [3].

In the well-known model of factor dependence for public health developed by academician Yu. P. Lisitsyn, 50% accounts for human lifestyle [4]. Studies confirm this theory with respect to patients with hypertension [5]. However, there are not enough studies examining the lifestyle of patients with hypertension.

Using the potential of health care without the active participation of the patient, and changing their behavior towards health care does not allow to provide the desired result in the treatment of the disease [6]. In health care, in recent years, qualimetric approach is increasingly used to characterize patients, and it provides a quantitative assessment of their qualitative characteristics, such as quality of life, and others. Under this approach, quantitative assessment of the "lifestyle potential" is carried out, which means quantitative assessment of whether the patient's actual activity matches the optimum level which, in its turn, matches tasks of preserving, improving, and restoring health and quitting bad habits [7]. The use of quantitative assessment of patients' lifestyle potential allows to store and process information in electronic form, conduct comparative analysis, and identify priority parameters of reduction that require targeted correction and recovery [7]. However, there is a dearth of research on the relationship between the effectiveness of cardiac medical care and completeness of realization of the lifestyle potential in patients. In light of the above, a medical and social study was conducted to investigate the lifestyle potential of patients with hypertension and its role in ensuring the effectiveness of treatment.

Materials and Methods

The study was conducted at medical institutions in the Kostroma Region. Study methods were: expert, sociological, analytical, and statistical. Data on 400 patients of cardiac profile were analyzed: data on lifestyle and data on the effectiveness of treatment. The information base for gathering material was data on social monitoring of patients' lifestyle parameters using the original automated program Management of Performance Factors for Cardiac Medical Care [8] which was introduced in the medical institutions of the Kostroma Region and consisted of data on expert assessment by the doctor of patient's lifestyle, as well as data on a sociological survey of these patients using Medical and Social Characteristics of Cardiac Patients questionnaire, including a block of patient demographics (age, gender, social status) and a block of 8 closed-ended questions on lifestyle. Characterization of lifestyle (activity) was given based on the following main parameters:

I. Physical activity level:

1. Low (do not do sports, do not do morning exercises, motor activity: less than 2 hours a day)
2. Closer to low, not optimal (do not do sports, do morning exercises, motor activity: 2–5 hours a day)
3. High (do sports, do morning exercises, motor activity: more than 5 hours a day)

II. Hygiene activity level:

1. Low (do not follow rules of personal hygiene, do not brush their teeth, take a shower irregularly, do not carry out cold training)
2. Closer to low, not optimal (carry out all the above activities, but not in full)
3. High (carry out all these activities completely)

III. Recreational activity level:

1. Low (sleep less than 6 hours, mostly passive recreation (watching TV, lying, sitting), no walks, no established system of work and rest cycles, no positive emotions, do not attend cultural and sporting events)
2. Closer to low, not optimal (sleep lasting for 6 to 7 hours, passive-active recreation, rare walks, no established system of work and rest

cycles, rare positive emotions, rarely attend cultural and sports events)

3. High (carry out all these activities completely)

IV. Household activity level:

1. Low (do not clean rooms, do not ventilate rooms, do not monitor temperature and humidity level in their home)

2. Closer to low, not optimal (carry out the above activities, but not regularly)

3. High (carry out above activities completely)

V. Medical activity level:

1. Low (do not seek timely medical advice, do not perform doctor's recommendations, do not comply with the regimen that contributes to health preservation, not interested in information about health preservation)

2. Closer to low, not optimal (carry out all the above activities, but not in full)

3. High (carry out above mentioned activities completely)

VI. Bad habits:

1. overeating (1. constantly; 2. rarely)

2. combining eating and reading (1. constantly; 2. rarely)

3. adding salt to food (1. constantly; 2. rarely)

4. adding spices to food (1. constantly; 2. rarely)

5. increased consumption of sweets (1. constantly; 2. rarely)

6. smoking (1. constantly; 2. rarely)

7. alcohol intake (1. constantly; 2. rarely)

Each parameter was evaluated by the doctor taking into account the survey of patients according to a three-point system (3 points corresponded to the optimal level, 2 points — intermediate, 1 point — low level of the parameter). Based on integrated assessment of patients' lifestyle (Mushnikov D. L., 2017, [7]), the automated program calculated the index of realization of the lifestyle potential, i.e. the correspondence of the patients' lifestyle characteristics to their optimal level according to the formula:

$$I_{\text{pot}} = (SP_f / SP_{\text{max}}) \times 100\%$$

The level of the lifestyle potential assessment in the range of 95–100% was considered as high, in the range of 75–94% as sub-optimal, and in

the range of 1–74% as low. In addition, the following questions were reflected in the questionnaire: according to recreational activity (compliance with sleep and rest regimen, duration of the working day, sleep duration, duration of out-of-doors period), characteristics of nutrition status (balanced diet, tendency to overeat, frequency of eating, abuse of food which is undesirable with hypertension, frequency of consumption of fruits and vegetables, body mass index level), characteristics of physical activity (frequency, volume, swimming pool), attitude towards bad habits (presence of bad habits, volume and type of smoking and consumption of alcoholic beverages), medical activity level in patients (the implementation of doctor's recommendations, timely visit to the doctor for preventive purposes, timely visit in case of acute illness, timely attendance for medical examination, complete implementation of doctor's recommendations, the reasons of failure to follow recommendations, self-monitoring of blood pressure, the rejection of self-medication, trust in physician, reasons for visits to the doctor and refusal from visits, reasons for refused admission, which was indicated, the presence of a blood pressure monitor at home and the skill of its usage), information activity (reading, medical newspapers and magazines, use of advertising brochures and stands as a source of information).

The effectiveness of medical care for patients with stage II to III hypertension was evaluated by experts according to the following criteria: low efficacy of secondary and tertiary prevention (frequent emergency calls more than 8 times a year and the presence of complications); high efficacy of secondary and tertiary prevention (with the frequency of emergency calls from 4 to 8 times a year and the absence of complications). A comparative analysis of the data of assessing the lifestyle potential in patients with low (the first group — 155 patients) and high (the second group — 245 patients) effectiveness of care was carried out.

Statistica 10.0 (StatSoft, Inc) was used for statistical processing of data (mean and relative values, their errors, reliability of their difference according to the Student's test). The critical value of statistical significance level was equal to 5%.

Results and Discussion

The composition of the groups was as follows: 69% of patients in the first group (155 people) were women, 31% — men, and in the second group (245 people) — 65.7% and 34.3%, respectively. The mean age of patients in the first group was (58.7 ± 0.3) years compared to (52.3 ± 0.1) years in the second group. Individuals aged over 60 years dominated among patients of the first group (87.25%), whereas in the second group, the proportion was significantly lower (61.2%) ($p < 0.05$). In the distribution by level of education, it was found that the majority of respondents (45.0%) of the first group had higher education, 34.5% had secondary special education, 18.0% secondary education, and 2.5% incomplete secondary and primary education, and in the second group this distribution was as follows: 23.3%, 56.3%, 20.0%, 0.4%. As can be seen from the data presented, in the first group the proportion of persons with higher education (45.0% vs. 23.3%) and low level of education (2.5% vs. 0.4%) is significantly higher than in the second group.

Among the interviewed individuals workers accounted for 21.3% (group I) vs. 45.3% (group II), office workers — 9.0% and 3.2%, managers — 7.1% and 4.5%, entrepreneurs — 2.6% and 1.6%, teachers — 9.7% and 2.5%, health care professionals — 1.9% and 0.0%, pensioners — 18.7% and 17.6%, persons with disabilities — 29.7% and 25.3%, respectively ($p < 0.05$).

All respondents, without exception, have chronic diseases other than hypertension, and they are aware of this. The incidence of comorbidity in the first group was 234.5 per 100 patients compared to 121.5 per 100 patients in the second group ($p < 0.05$). And the first group had a significantly higher frequency of such a pathology as chronic kidney disease, diabetes, thyroid disease, and degenerative spine disease.

According to the results of the integral assessment of the lifestyle potential of cardiac patients with hypertension, it was found that the overall index of potential realization was 72.5%, including in the first group — 60.5%, in the second group — 79.5%, indicating the presence of a deviation of this parameter from the optimal value (100%) by 27.5%, 39.5% and 20.5%, respectively ($p < 0.05$) (Table 1).

As can be seen from Table 1, the first ranking place in terms of the lifestyle potential belongs to the “Hygiene activity” component (in the first group I_{pog} index was $(89.0 \pm 1.4)\%$, in the second group — $(94.5 \pm 1.6)\%$, and the overall index was $(92.5 \pm 1.5)\%$) ($p < 0.05$); the second ranking place belongs to “Household activity” (in the first group I_{pog} index was $(86.5 \pm 1.5)\%$, in the second group — $(93.5 \pm 1.8)\%$, and overall index was $(88.5 \pm 1.6)\%$) ($p < 0.05$); the third ranking place belongs to “Bad habits” (in the first group I_{pog} index was $(70.5 \pm 1.6)\%$, in the second group — $(79.5 \pm 1.5)\%$, and the overall index was $(75.0 \pm 1.7)\%$) ($p < 0.05$); the fourth ranking

Table 1. Summary of the lifestyle potential assessment of patients with hypertension (%)

Lifestyle potential components	Level of implementation			Rank of potential realization
	The first group (low effectiveness of treatment)	The second group (high effectiveness of treatment)	In both groups	
Physical activity	70.5 ± 1.5	$79.5 \pm 1.8^*$	74.5 ± 1.6	4
Hygiene activity	89.0 ± 1.4	$94.5 \pm 1.6^*$	92.5 ± 1.5	1
Recreational activity	68.5 ± 1.7	$75.5 \pm 1.5^*$	73.2 ± 1.3	5
Household activity	86.5 ± 1.5	$93.5 \pm 1.8^*$	88.5 ± 1.6	2
Medical activity	64.5 ± 1.4	$72.0 \pm 1.9^*$	68.5 ± 1.6	6
Bad habits	70.5 ± 1.6	$79.5 \pm 1.5^*$	75.0 ± 1.7	3
Potential fulfillment	60.5 ± 1.4	$79.5 \pm 1.5^*$	72.5 ± 1.6	
Potential fulfillment margin	39.5 ± 1.4	$20.5 \pm 1.5^*$	27.5 ± 1.6	

Note. * There is a significant difference in parameters ($p < 0.05$)

place belongs to “Physical activity” (in the first group I_{pog} index was $(70.5 \pm 1.5)\%$, in the second group — $(79.5 \pm 1.8)\%$, and the overall index was $(74.5 \pm 1.6)\%$) ($p < 0.05$); the fifth ranking place belongs to “Recreational activity” (in the first group I_{pog} index was $(68.5 \pm 1.7)\%$, in the second group — $(75.5 \pm 1.5)\%$, and overall index was $(73.2 \pm 1.3)\%$) ($p < 0.05$); and the sixth ranking place belongs to “Medical activity” (in the first group I_{pog} index was $(64.5 \pm 1.4)\%$, in the second group — $(72.0 \pm 1.9)\%$, and overall index was $(68.5 \pm 1.6)\%$) ($p < 0.05$). Thus, the priority components of improving the lifestyle of patients with hypertension are: medical activity (margin for improvement: 31.5%), recreational activity (margin for improvement: 26.8%) and physical activity of patients (margin for improvement: 25.5%), which should be taken into account in the formation of “School for Patients with Hypertension” programs.

Let us discuss the results of the sociological survey among patients based on the individual lifestyle components in detail.

Recreational activity is one of the important components of a healthy lifestyle and a condition of active longevity. However, as the survey showed, a significant part of patients do not get enough rest. Thus, 17.3% of respondents of the first and 34.7% of the second group ($p < 0.05$) pay attention to the observance of sleep and rest regimen. The duration of the working day in 53.3% of the respondents of the first group was 8 hours, in 11.0% — 12 hours, in 2.8% — 24 hours (daily duty), vs. 78.9%, 14.5%, and 6.6% in the second group ($p < 0.05$), respectively. In the first group, 35.5% of respondents complain of regular fatigue at work, vs. 12.5% in the second group ($p < 0.05$). Sleep duration in 86% of respondents of the first group is 8 hours a day, in 12.0% — 9 to 12 hours, in 2.0% — less than 8 hours, vs. 83.4%, 16.0% and 0.6% in the second group ($p < 0.05$), respectively. Daily outdoor activity is typical only for 19.75% of respondents of the first group and 29.8% of the second group ($p < 0.05$).

Proper, rational diet is one of the elements of hypertension treatment. However, as the survey showed, a significant proportion of patients do not adhere to the principles of rational nutrition. Only 24.75% of respondents of the first group

follow a balanced and regular diet, and irregular and unbalanced nutrition is typical for 57.75%, of them overeating is noted by 22.25%; 17.5% of people found it difficult to answer; and in the second group this distribution looked as follows: 55.4%, 34.5%, 10.1% ($p < 0.05$). Most respondents of the first group eat 3 times a day (59.5%), 27.25% eat 4 or more times a day, and 13.25% eat 1 to 2 times a day. And in the second group the distribution is as follows: 67.8%, 30.2%, 2% ($p < 0.05$), respectively. It was noted that the abuse of food undesirable for hypertension (fatty, salty, spicy, high carbohydrate foods) is typical for 57.25% of respondents of the first group and 23.1% of the second group ($p < 0.05$). Fruits and vegetables are in the daily diet of 53.5% of the respondents of the first group, and 20.25% of people consume fruits and vegetables more than 2 times a week; fruits and vegetables in the diet are found only 2 times a week in 23.5%, less than 2 times a week — in 2.75%; the distribution in the second group is as follows: 69.5%, 24.5%, 6%, 3% ($p < 0.05$), respectively. When calculating the Quetelet index (body mass index) by the formula $\text{weight}/\text{height}^2$ (kg/m^2), only 14.8% of patients of the first group had normal weight, 56.0% of patients were overweight, 26.8% have 1st degree obesity, 2.5% of patients have 2nd degree obesity; in the second group the distribution is as follows: 53.2%, 34.5%, 18.3%, 4% ($p < 0.05$), respectively.

Only 13.3% of respondents of the first group and 34.5% of the second group ($p < 0.05$) pay attention to improving their health (they are physically active, visit swimming pool).

Attitude towards bad habits is reflected by the following survey results: about a third of patients with hypertension of the first group smoke (29%), 65.5% of patients do not smoke, and of them 5.5% were former smokers, but had quit; in the second group the distribution is as follows: 17.6%, 69.4%, 13% ($p < 0.05$), respectively. In the first group, 9.2% smoke more than 1 pack of cigarettes per day, vs. 1.4% in the second group. Alcohol abuse is typical for 52% of men and 1.7% of women in the first group and for 21.3% and 0.3% in the second group, respectively ($p < 0.05$). Among all of them, 12.5% prefer dry wine, 21.5% — stiff wine, 64.5% — vodka, 1.2% — cognac, and 0.3% — moonshine ($p < 0.05$).

Medical activity level of patients with hypertension was studied. It was found that in the first group, almost half of the patients (46.0%) follow doctor's recommendations clearly, 35.8% — partially, 18.3% — scarcely follow vs. 89.0%, 10.0%, 1% in the second group, respectively ($p < 0.05$). In the first group only 13.5% of patients visit the primary care physician for preventive purposes, 72.0% — when feeling unwell, 5.5% — do not visit at all vs. 44.5%, 52.3%, 3.2% in the second group, respectively ($p < 0.05$). In the case of disease exacerbation among patients of the first group, 19.3% of patients visit the out-patient department at the place of residence, 2.0% go to private clinics, 9.7% — to familiar doctors, 63.3% — to emergency doctors, and 5.7% — to another out-patient department or hospital; in the second group, the distribution is as follows: 44.5%, 3.4%, 10.2%, 35.4%, 6.5% ($p < 0.05$), respectively. Among patients of the first group, only 21.0% go for medical examination on their own at the appointed time, 12.3% go only after repeated call, and 66.8% of the respondents do not go at all vs. 45.6%, 49.0%, 5.4% in the second group, respectively ($p < 0.05$). Prescriptions and recommendations of the primary care physician were followed and performed in full by 52.5% of patients of the first group, partially — by 40.0%, and were not followed by 7.5%; in the second group the distribution is as follows: 79.8%, 20.0%, 0.2% ($p < 0.05$), respectively. The reasons for non-compliance with the prescriptions and recommendations of the primary care physician in patients of the first group was the lack of financial capacity to buy drugs (9.0%), ineffectiveness of recommended treatment (29.3%), and personal irresponsibility (22.0%) vs. 17.5%, 24.3%, 10.9% in the second group, respectively ($p < 0.05$). Regular monitoring of blood pressure is performed by 20.0% of respondents in the first group, only when feeling unwell — by 40.5%, and 29.5% do not monitor their pressure; in the second group, the distribution is as follows: 44.5%, 50.5%, 5% ($p < 0.05$), respectively. Self-treatment of hypertension was performed by 26.5% of patients of the first group, and by 10.2% of the second group. The main reason for seeking medical advice is to obtain a temporary disability certificate (34.5% of respondents). Only 15.0% of

respondents in the first group and 34.5% in the second group ($p < 0.05$) fully trust their doctor as a specialist. Patients reported unfriendly, inattentive attitude and dishonesty of the doctor (52.5% of patients), long queues at the primary care physician and other specialists (43%), misunderstanding of the patient's problems by the doctor (4.5%) ($p < 0.05$) among the reasons for not visiting the outpatient department. Among patients of the first group, 7.8% of patients agree to inpatient treatment (if necessary), 22.8% agree in some cases, and 20.8% categorically refuse, 48.8% of patients do not want to be treated in hospital at the place of residence, and the figures in the second group were 44.5%, 30.5%, 12.3%, 12.7% ($p < 0.05$), respectively. Among the reasons for refusal of inpatient treatment, patients noted: poor attitude of medical staff (64.0%) and the lack of effect from treatment provided by the doctors of the hospital (42.5%).

Raising patients' awareness of the disease, methods of prevention of its worsening and risk factors is one of the important aspects of successful treatment of hypertension as a chronic disease which the patient will have to cope with all their life. However, according to the survey, among patients of the first group, 26.8% of respondents read medical literature on hypertension, 2.5% of respondents subscribed to newspapers and medical journals, 21.3% of respondents used advertising brochures and stands as a source of information, only 3.0% of patients bought literature on the treatment and prevention of hypertension; in the second group, this distribution is as follows: 45.6%, 3.9%, 34.5%, 7.8% ($p < 0.05$), respectively. These data suggest that patients of the second group had significantly higher information activity than patients of the first group.

Monitoring of blood pressure in hypertension is the main and universally accessible method of disease diagnosis. Hence, this issue has been studied among patients of comparison groups. It is established that 57.0% of patients have a blood pressure monitor at home and measure blood pressure, 0.3% of patients use the device of neighbors; 9.2% of respondents call an ambulance for this purpose; 10.5% call the primary care physician; 20% of patients visit the out-patient department for measurement of pressure; in the second group,

the figures are as follows: 76.5%, 0.2%, 3.2%, 8.7%, 11.4% ($p < 0.05$), respectively. From these data it follows that in the first group, patients are 2 times more likely than in the second group to seek assistance from doctors in out-patient departments and emergency medical care only to measure the pressure.

Conclusions

Thus, in patients with hypertension, there is a decrease in lifestyle potential, in all its components, including low medical activity, low medical awareness, insufficient level of recreational activity, disregard for the principles of rational nutrition, and the prevalence of bad habits.

There are significant differences in the lifestyle potential of patients with low and high levels of treatment success proving the importance of modifying the lifestyle of patients and its improvement in the practice of primary care physicians.

It is recommended to monitor the lifestyle potential of patients with hypertension in conditions of district out-patient departments with the determination of priority medical and social problems of patients, opportunities and margins for improving lifestyle. The heads of primary health care institutions should pay attention to the availability and quality of activities to form the basis of healthy lifestyle in patients with hypertension by health professionals.

Conflict of interests

The authors declare no conflict of interests.

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