KIROV MILITARY MEDICAL ACADEMY

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MODERN APPROACHES TO THE ORGANIZATION OF MEDICAL CARE WITH THE USE OF REMOTE BLOOD PRESSURE MONITORING

Scientific specialty 3.2.3. Public health, healthcare organization and sociology, medical and social expertise

THESIS
for the degree of
Candidate of Medical Sciences

Translation from Russian

Scientific advisor:
Doctor of Medical Sciences
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Saint-Petersburg
2023

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INTRODUCTION

Relevance of the study

According to the World Health Organization (WHO), cardiovascular diseases are one of the leading causes of mortality among the population of developed countries of the world [3, 5, 7, 8, 10, 11, 14, 15, 16, 17, 21, 23, 27, 31]. Despite the measures taken to control, the prevalence of arterial hypertension, on the one hand, as an independent disease, and as a risk factor for cardiovascular diseases (CVD) in the world among adults, on the other hand, remains at a high level and ranges from 450 to 900 million people (30-40%), and in Russia - more than 40 million people (39% of men and 41% of women). Moreover, there is an increase in this pathology in younger patients, even in countries with a good level of health system development [23, 40, 41, 43, 45, 47, 48, 52, 53, 64, 72, 79, 80, 82, 87, 91, 103, 164].

The accumulated world and domestic experience show that adequate treatment of arterial hypertension reduces incidence and mortality from CVD, primarily from strokes [35, 37, 46, 64, 74, 77, 78, 87, 90]. Prevention programs conducted in a number of cities of the former USSR in the 1980s proved their efficiency at the population level. Economic losses in the Russian Federation (RF) associated with excessive incidence from diseases of the circulatory system, as well as the costs of providing care to cardiac patients are growing every year [11, 65, 67, 68, 69, 72, 81, 83, 88, 90, 94, 95, 112, 115] and annually exceed 1 trillion rubles [87, 137, 166, 167, 171, 176].

It should be noted that in recent years, scientists have paid more and more attention to the study of social, demographic and psychological characteristics of various categories of patients, taking into account the fact that these indicators are largely associated with the presence of a number of risk factors for the development of diseases (excess body weight, insufficient physical activity, alcohol abuse and psychosocial stress, arterial hypertension), as well as patient adherence to treatment [3, 4, 6, 12, 14, 16, 17, 19, 20, 27, 28, 32, 38, 55, 61, 64, 75, 77, 78, 82, 83, 90, 93, 95, 98, 180].

The decrease in mortality from CVD in the Russian Federation is due, on the one hand, to the improvement of early diagnosis and, as a consequence, the adoption of timely

preventive measures, and, on the other hand, to the growth of the economic situation in the Russian Federation - the availability of high-tech medical care [38, 100, 105, 106, 113, 115, 117, 134, 138, 139, 142, 143, 150, 151, 152, 155, 158, 160, 192].

The set of practices is a range of effective interventions aimed at strengthening the control of CVD risk factors at the primary health care level. It is used to prevent cardiovascular disease by ensuring equal access to continuous and high-quality medical care for people at high risk of developing cardiovascular diseases [6, 16, 19, 21, 38, 47, 55, 56, 62, 63, 70, 75, 79, 87, 95, 97, 101, 102].

The increase in demands of the population for preventive measures indicate the need to search for new organizational and digital solutions to improve the organization of medical care in outpatient settings, including the use of remote blood pressure monitoring, which implies the redistribution of functional responsibilities of medical personnel and participatory interaction with patients [26, 105,107, 109, 110, 111, 113, 115, 118, 122, 125, 166, 131, 138, 152, 155, 158, 164, 169, 170, 174, 192].

Modern approaches to improving medical care in outpatient settings are built on the principles of a personalized approach to public health, prediction, prevention and participation. The introduction of new approaches and methods with the use of telemedicine technologies, based on the rational use of available material and technical and human resources, will contribute to increasing access to quality medical care for the population of the Russian Federation. Mobile healthcare (mHealth) is one of the most promising and dynamically developing areas in the Russian Federation in the field of e–health [26, 44, 121, 124, 131, 135, 137, 145, 146, 173, 174, 181, 186,192, 198].

To date, there are still unresolved topical issues on the distribution of functions between medical and non-medical personnel not only in the Russian Federation, but also in most countries of the world. Undoubtedly, the possibility of redistributing functions between medical personnel with higher or secondary education and non-medical specialists will improve the availability of medical care without loss of quality, especially with limited financial and labor resources. The resolution of these issues, consisting of some functions to the nursing and non-medical personnel, frees up the physician's time to work with patients. At the same time, functions that do not require specialized skills and

medical education can be redirected from nurses to non-medical employees in outpatient facilities to reduce the additional burden on mid-level health workers [25, 26, 30, 44, 51, 76, 99, 120, 132, 140].

The active introduction of telemedicine and structural and functional technologies of medical care organization, including the use of remote blood pressure monitoring, in the primary health care, taking into account the redistribution of functional responsibilities of medical personnel and on the basis of participatory interaction with patients, will be facilitated by improving the legislative framework, conducting comprehensive scientific research with an analysis of their effectiveness and development of recommendations for their application [1, 13, 18, 32, 37, 39, 43, 44, 66, 84, 121, 124, 131, 135, 137, 145, 146, 173, 174, 181, 186, 192, 198].

Thus, the relevance of improving the organization of medical care in outpatient settings within the framework of a high-risk strategy is primarily due to the need to find adequate organizational solutions to reduce economic losses, associated with excess mortality from cardiovascular diseases and growing costs of medical care for cardiac patients [3, 5, 7, 8, 10, 11, 14, 15, 16, 17, 19, 21, 23, 27, 31, 47, 55, 56, 62, 63, 70, 75, 79, 87, 95, 97, 101, 102, 137, 166, 167, 171, 176]. And also, with the objective need to provide conditions for redistribution of functional responsibilities of medical professionals and participatory interaction with patients, without which it is impossible to ensure the introduction of new telemedicine and structural and functional technologies, including the use of remote blood pressure monitoring [1, 4, 37, 44, 51, 67, 71, 83, 84, 102, 114, 138, 141, 142, 149, 159, 167, 174, 175, 179, 180, 185, 186].

The degree of elaboration of the research topic

Analysis of the dynamics and trends of the main indicators of public health, as well as the prevalence and clinical features of arterial hypertension, according to many scientists [2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 4, 51, 47, 55, 56, 62, 63, 64, 67, 70, 71, 75, 79, 87, 86, 95, 97, 101, 102, 114, 138, 141, 142, 149, 154], indicates the need to identify areas of improvement and search for new approaches to the organization of medical care in outpatient settings in

order to ensure its accessibility [21, 22, 23, 24, 25, 26, 27, 28, 29; 4, 51, 47, 55, 56, 62, 63, 64,67, 70, 71, 75, 79, 87, 86, 95, 97, 101, 102, 114, 138, 141, 142, 149, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179,180].

The study proposes a structural and functional technology with the use of remote blood pressure monitoring based on the redistribution of functional responsibilities, which can serve as a basis for improving medical care. It will improve the accessibility of medical care for the population and increase its medical and social efficiency.

The result of successful implementation of structural and functional technology of medical care organization with the use of remote blood pressure monitoring will be an increase in the availability of medical care for the population due, first of all, to an increase the time of physician to receive patients and reduce the communicative load among medical professionals, as well as by reducing complications from cardiovascular diseases and reducing incidence and mortality in the long term.

Thus, the degree of development of the application of telemedicine and structural and functional technologies of medical care organization is insufficient, which determines the purpose and objectives of this thesis research.

The purpose of the study is to justify and apply the structural and functional technology of organization of medical care delivery using remote monitoring of patients' blood pressure.

The objective of the study predetermined the need to solve the following tasks:

1. To conduct a content analysis of the incidence and mortality rates of cardiovascular diseases in the population according to the literature (2017-2021);

2. To study the prevalence and awareness of patients of working age about risk factors for hypertension;

3. To propose a new structural and functional technology of medical care organization with the use of remote blood pressure monitoring;

4. To scientifically substantiate the use of remote blood pressure monitoring in patients of working age as the main element of structural and functional technology of

the organization of medical care, taking into account the redistribution of functional responsibilities of medical personnel;

5. To develop proposals for improving the organization of medical care based on the implementation of structural and functional technology with the use of remote monitoring of patients' blood pressure.

Scientific novelty of the study

For the first time the structure and dynamics of incidence and mortality of the population from cardiovascular diseases in St. Petersburg, in the Russian Federation and abroad during the study period (2017-2021) were analyzed.

The prevalence of risk factors for the development of cardiovascular diseases in St. Petersburg, in the Russian Federation, and abroad was assessed (2017-2021). Modern approaches to the prevention of cardiovascular diseases in the Russian Federation as part of a high-risk strategy were analyzed. The role and place of telemedicine technologies in providing medical care to patients with cardiovascular diseases were noted.

For the first time the functional state of the cardiovascular system in patients who applied to the arterial hypertension prevention cabinet of SPb GBUZ "City Polyclinic No.19" and SPb GBUZ "City Polyclinic No.91" from 2014 to 2018 was analyzed.

Remote blood pressure monitoring as the main element of structural and functional technology of organization of medical care, taking into account the redistribution of functional responsibilities and participatory interaction of medical workers with patients was scientifically substantiated, as well as medical and social effectiveness of its application was proved.

At the population level, the structural and functional technology of the organization of medical care with the use of remote monitoring of blood pressure was tested.

Proposals have been developed to improve the organization of medical care based on the implementation of structural and functional technology using remote blood pressure monitoring, taking into account the redistribution of functional responsibilities of medical professionals.

Practical significance of the study is determined by the fact that the use of structural and functional technology of medical care organization with the use of remote blood pressure monitoring contributes to improving the efficiency of medical care in outpatient settings and increases its medical and social efficiency. It is based on the redistribution of functional responsibilities of medical professionals and participatory interaction with patients. The increase in efficiency is due to a decrease in the number of complications, due to an increase in the proportion of patients with a controlled course of the disease, as well as to the provision of access to medical care at the population level.

Theoretical significance of the study is to determine the main directions for improving the organization of medical care in outpatient settings using structural and functional technology with the use of remote blood pressure monitoring on the basis of redistribution of functional responsibilities of medical professionals taking into account participatory interaction with patients.

The structural and functional technology of the organization of medical care with the use of remote blood pressure monitoring based on the redistribution of functional responsibilities and participative interaction with patients was developed.

The proposed structural and functional technology for the organization of medical care allows to strengthen medical and social efficiency in the shortest time and reduce the risk of complications in patients of working age with a cardiological profile in the medium term. In the long term it will reduce incidence and mortality from cardiovascular diseases and improve accessibility and quality of medical care, as well as reduce economic losses.

Developed and substantiated for application:

Proposal to the Russian Society of Cardiology on the inclusion of the method of remote blood pressure monitoring in the clinical recommendations on arterial hypertension for remote dynamic monitoring (Appendix L);

Amendments to f-030/u "Control chart of regular medical examination" with the use of remote monitoring (Appendix D);

Memo to patients on the use of remote blood pressure monitoring (Appendix E);

Memo to medical/non-medical personnel on conducting structural and functional technology of remote blood pressure monitoring with redistribution of functional responsibilities (Appendix F);

Information and methodological materials for patients of the online "School of remote blood pressure monitoring" (Appendix C).

The study materials are used in the educational processes of the Faculty of Secondary Professional Education and the Department of Health Care Organization and Public Health of the Kirov Military Medical Academy and the Medical College of the St. Petersburg State University (Appendices G, I, K).

Research methodology and methods

Theoretical and methodological basis for assessing the efficiency of the organization of preventive care for the population with cardiovascular diseases (arterial hypertension) in the first-level medical organizations on the example of the arterial hypertension prevention cabinet using telemedicine techniques were conceptual provisions of fundamental and applied works of domestic and foreign scientists specializing in the field of organization and management of healthcare.

The methodological basis of the study was an integrated approach that allows to determine the method of remote blood pressure monitoring as the main direction of arterial hypertension prevention in the provision of primary health care to patients with cardiovascular diseases, and its scientific substantiation. The following research methods were used: descriptive, analytical, questionnaire, statistical, method of statistical data analysis.

The basic provisions for the thesis defence:

1. In-depth analysis of literature sources on incidence and mortality from cardiovascular diseases and the use of information and communication technologies in health care suggests that structural and functional technology using remote monitoring of blood pressure is the basis for determining approaches to improving the organization of medical care for cardiological patients in outpatient settings.

2. Medical and social efficiency of care provided in outpatient settings to patients with cardiovascular diseases has reserves for improvement through the use of structural and functional technology of medical care organization with the use of remote blood pressure monitoring on the basis of redistribution of functional responsibilities of medical personnel and participatory interaction with patients.

3. The developed proposals for improving the organization of medical care and the implementation of structural and functional technology with the use of remote monitoring of blood pressure to patients will contribute to the effective management of medical personnel, increase the time for patient reception and reduce the number of complications from cardiovascular diseases, which will ensure the availability and quality of medical care at the population level.

Main scientific results

The scientific work was carried out using a sufficient amount of material, which formed the basis for a retrospective analysis for a long-term period (2014-2021). The selection of the studied materials was made taking into account representativeness and corresponds to the general population. The statistical sample was carried out by the target method.

The obtained results are used in the scientific and pedagogical activities of the Department of Health Care Organization and Public Health and the Faculty of Secondary Professional Education of the "Kirov Military Medical Academy" and the Medical College of the "St. Petersburg State University".

The main results and provisions of the scientific work are presented:

1. Fedotkina S.A., Khugaeva E.V. Analysis of risk factors for the development of cardiovascular diseases in people of working age. Social aspects of public health. 2022. Vol. 68. No. 6.

2. Fedotkina S.A., Khugaeva E.V. Awareness of the population about cardiovascular factors of disease development as a result of the application of a population strategy. / Siberian Journal of Life Sciences and Agriculture. 2023. Vol. 15. No. 2. pp. 178-194.

3. Fedotkina S.A., Khugaeva E.V. Causes and frequency of complications of risk factors for the development of cardiovascular diseases among the able-bodied population. / Bulletin of St. Petersburg University. Medicine. 2022. Vol. 17. No. 4. pp. 281-294.
4. Fedotkina S.A., Khugaeva E.V. Improvement of medical care in conditions of mobile healthcare. / In the collection: Fundamental and applied research. Current problems and achievements. collection of articles of the XXII All-Russian (national) scientific conference. St. Petersburg, 2023. pp. 10-12.
5. Khugaeva E.V., Skripsky S.A. Analysis of organizational decisions on the redistribution of functions between employees of a medical organization providing primary health care. / In the collection: Breakthrough scientific research: problems, limits and opportunities. Collection of articles of the International Scientific and Practical Conference. UFA, 2023. pp. 129-132.
6. Fedotkina S.A., Khugaeva E.V. Patient satisfaction with the provision of medical care using mobile healthcare (mhealth). / In the collection: Scientific research in the modern world. Theory and practice. collection of articles of the XXII international scientific conference. St. Petersburg, 2023. pp. 14-16.
7. Khugaeva E.V. Remote monitoring of blood pressure as an element of personalized medicine. / International Journal of Advanced Studies in Medicine and Biomedical Sciences. 2023. No. 1. pp. 68-79.
8. Fedotkina S.A., Khugaeva E.V. Analysis of the possibility of using remote monitoring of blood pressure as a preventive element in the prevention of cardiovascular diseases. / In the collection: Effective management and control in healthcare. Materials of the All-Russian scientific and practical conference. Edited by I.T. Rusev, A.H. Akhmineeva. St. Petersburg, 2022. pp. 121-125.
9. Khugaeva E.V. Assessment of risk factors for the development of diseases in teachers of educational institutions. / In the collection: Integration of world science and technology: new concepts and paradigms. Materials of the II International Scientific and Practical Conference. Stavropol, 2023. pp. 104-106.
10. Kochergin I.A., Tyagnerev A.T., Khugaeva E.V. Theoretical aspects of individual prevention of cardiovascular diseases. / In the collection: Effective management and

control in healthcare. Materials of the All-Russian scientific and practical conference. Edited by I.T. Rusev, A.H. Akhmineeva. St. Petersburg, 2022. pp. 29-34.
11. Fedotkina S.A., Khugaeva E.V. Analysis of the effectiveness of innovative methods of monitoring arterial hypertension. / In the collection: Scientific and technological progress as a mechanism for the development of modern society. collection of articles based on the results of the International Scientific and Practical Conference. Sterlitamak, 2022. pp. 6-15.
12. Fedotkina S.A., Khugaeva E.V. Assessment of awareness of patients in outpatient healthcare on the use of remote monitoring of blood pressure indicators. / Modern health-saving technologies. 2022. No. 4. pp. 155-165.
13. Fedotkina S.A., Muzaleva O.V., Khugaeva E.V. Retrospective analysis of the use of telemedicine technologies for the prevention, diagnosis and treatment of hypertension (literature review). / International Journal of Advanced Studies in Medicine and Biomedical Sciences. 2021. No. 2. pp. 4-22.
14. Rusev I.T., Fedotkina S.A., Khugaeva E.V. Development of telemedical technologies as the main vector for prevention of circulatory system diseases (scientific review). / Eurasian Scientific Association. 2020. Vol. 7-3. No. 65. p. 189.

The author personally formulated the purpose, objectives of the study, the provisions submitted for protection; carried out planning, collecting material using the proposed primary statistical documents. A generalization and mathematical and statistical analysis of the results of the study were carried out. The conclusions, practical recommendations are scientifically substantiated and prospects for further development of the research topic are proposed. The use of structural and functional technology for the organization of medical care using remote monitoring of blood pressure, taking into account the redistribution of functional responsibilities of medical workers and participatory interaction with patients in outpatient settings, evaluation of its effectiveness and the results of their own research were personally 100% performed by the author.

CHAPTER 1 MEDICAL AND SOCIAL APPROACHES TO PROVISION OF MEDICAL CARE FOR PATIENTS WITH CARDIOVASCULAR DISEASES (Literature review)

The problem of combating cardiovascular diseases is the highest priority for the Russian Federation, as well as the European region of the World Health Organization (WHO). It is caused by the social significance of diseases characterized by high blood pressure. Many scientists confirm the enormous damage to the society and economy of countries associated with the loss of temporary and permanent working capacity, as well as premature mortality from cardiovascular diseases [3, 5, 7, 8, 10, 74, 77, 89, 144].

Considering the mass nature of diseases, including "hidden" patients among the population, an integrated approach to the treatment of patients with the analyzed group of diseases requires huge costs for diagnosis, rehabilitation, prevention of premature mortality and social support of patients [11, 14, 15, 16, 17, 21, 74].

The priority solution to the problem of social diseases is the prevention of risk factors and their development with the implementation of modern technological preventive measures. This will allow targeted and successful use of economic and medical resources for primary prevention of socially significant diseases and health improvement of the population [23, 40, 41, 43, 45, 47, 48, 52, 53, 64, 72, 79, 80, 82, 87, 91, 103, 164].

1.1 Analysis of incidence rate of the population from cardiovascular diseases in St. Petersburg, the Russian Federation and abroad according to the literature sources (2017-2021)

For the past four decades, the results of a large number of studies have been published, showing significant variability in the prevalence of AH in different countries and revealing a number of factors that influence BP levels, such as gender, age, general health status of the population, environmental conditions, level of education and culture [74, 77, 89, 144].

In a well-known systematic review devoted to the analysis of the prevalence of AH

in the world, R. Kearney et al. [17] noted significant differences between different countries in the prevalence of AH. The range of variability in AH prevalence ranged from 3.4% in men in rural India to 72.5% in Polish women. In economically developed countries in Europe and North America, the prevalence of AH ranged from 20 to 50% [22] and was higher in women than in men, in particular higher in the Negroid race than in the Caucasian race. In economically developing countries of Asia [32, 214], Africa and Latin America, the prevalence of AH was lower than in developed countries and was about 20-30%. The prevalence of AH in women was also higher than in men [42], and the prevalence of AH in the Negroid race was higher than in the Caucasian race, but these differences were smaller than in economically developed countries. Differences in the prevalence of AH among urban and rural residents were inconsistent. Thus, in Spain, the prevalence of BP among rural residents was significantly higher than among urban residents. The opposite was observed in Paraguay [29, 206], Iran, Korea, Cameroon, Thailand and Taiwan, while there were no differences in Poland, Tanzania and China [17, 205, 206].

The uneven prevalence of AH in economically developed countries is noted in the work K. Wolf-Maier et al. [26, 220 – 236]. The average prevalence of AH in six European countries (England, Finland, Germany, Italy, Spain, Sweden) was 44.2%, and in Canada and the United States of America (USA) it was 27.6%. Germany had the highest prevalence of AH in Europe (55.0%), followed by Finland (49.0%), Spain (47.0%), England (42.0%), Sweden (38.0%), and Italy (38.0%), respectively. The prevalence of AH in the United States and Canada was about half that in Germany (28.0% and 27.0%, respectively). The average BP in European countries was also higher than in North American countries (136/83 and 127/77 mmHg, respectively). Similar differences in BP values were observed in all age groups from 35 to 74 years and reached a maximum at age 65 years (13 mmHg for systolic BP) [26, 187-205].

Repeated studies of AH prevalence in a number of countries have revealed certain trends in the prevalence of AH in the world. In the United States, a significant decrease in the prevalence of AH and average BP levels was observed in the period from 1950 to 1989, which coincided with the beginning of widespread use of antihypertensive agents

[20], the period from 1989 to 1994 was characterized by relative stability of AH prevalence rates, and from the beginning of 1999 there was a trend towards an increase in the prevalence of AH. The increased prevalence of AH is attributed to the general aging of the population and an increase in the proportion of individuals with increased body weight, as well as a disproportionate increase in the prevalence of AH in black women and those from disadvantaged social and economic status [15, 22, 25, 64].

The MONICA (Monitoring trends and determinants in cardiovascular disease) study conducted in European countries revealed a significant decrease in the prevalence of AH between 1985 and 1995 in a number of countries compared to earlier studies. In particular, in Belgium, the prevalence of AH decreased from 41% and 30.5% to 26.7% and 20% in men and women, respectively [17].

In contrast to European countries, Asian countries have shown an increasing trend in the prevalence of AH in recent decades. Thus, in China, between 1991 and 2001, the prevalence of AH increased from 20.2% to 28.6% in men and from 19.1% to 25.8% in women [11]. In Singapore, the prevalence of AH increased from 22.5% in 1992 to 26.6% in 1998 [17, 21, 25, 58].

A meta-analysis of the prevalence of AH in India published in 1996 [19] showed a significant increase in the prevalence of AH between 1949 and 1995. The increase in the prevalence of AH was accompanied by an increase in the average level of SBP and was more pronounced in the urban population compared to the rural population [13]. There was no significant increase in the prevalence of AH in India between 1995 and 2002 [12].

The results of epidemiologic studies indicate that the incidence of AH varies by age, gender, and race. At the same time, the patterns common to all countries are an increase in the incidence of AH with age and a higher incidence of AH in persons of the Negroid race compared with persons of the Caucasian race [14].

According to a study conducted by ARIC (Atherosclerosis risk in communities, 1987), the incidence of AH was: in persons of the Caucasian race - 37 cases per 1000 population per year among women and 40 cases per 1000 population per year among men; in persons of the Negroid race - 77 cases per 1000 population per year among women and 67 cases per 1000 population per year among men [14].

In the CARDIA (Coronary artery risk development in young adults, 1985-1986) study, the ten-year incidence of AH in Americans aged 18-30 years was higher in persons of the Negroid race compared with persons of the Caucasian race and higher in women than in men (African Americans: 16.4% in men and 13.1% in women; whites: 7.8% in men and 3.2% in women) [14, 29, 30].

According to the long-term Fremingham Cohort Study of the cardiovascular system in the population aged 30-39 years (currently ongoing), the development of arterial hypertension within two years was reported in 3.3% of men and 1.5% of women, and at age of 70-79 years - in 6.2% of men and 8.6% of women. In the 2000s, it was revealed that the risk of developing AH in middle-aged and elderly individuals reaches almost 90%, and at the age of less than 40 years, the risk of developing AH in men is twice as high as in women [47, 93].

The epidemiological monitoring conducted in the Russian Federation (2013-2018) revealed the prevalence of AH in persons older than 15 years [19, 20] at the level of 39.5%, which indicates about forty million people suffering from arterial hypertension. It occurred more often in women than in men (40.4% and 37.2%, respectively). The highest prevalence of AH was observed in the Southern and Volga Federal Districts (45.9% and 43.2%, respectively), followed by the Siberian Federal District (42.5%), Northwestern District (41.2%), Central District (36.5%), Urals District (36.2%), and Far Eastern Federal District (32.3%) [16, 19, 20, 144].

In the Russian Federation, the incidence of diseases characterized by high blood pressure in 2017 amounted to 10 363.7 cases per 100 thousand population, in 2018 – 11 004.0 cases per 100 thousand population, in 2019 – 11 657.0 cases per 100 thousand population and in 2020 – 11 191.9 cases per 100 thousand population, which corresponded to the first place among all cardiovascular diseases. Compared to 2010, there was an increase in the incidence of AH by 2 940 cases per 100 thousand population or by 26.3% [19, 29, 42, 53].

According to the Department of the Federal State Statistics Service for St. Petersburg and the Leningrad Region [8], the overall incidence of CVD (according to the data of circulation) for 5 years from 2017 to 2021 showed a decrease in rates from 32

774.4 per 100 thousand population in 2017 to 29 799.4 per 100 thousand population in 2021 - a decrease of about 9.1% [49, 52, 54, 58].

The primary incidence, meanwhile, increased by 28.6%: from 2 494.4 per 100 thousand population in 2017 to 3 091.9 per 100 thousand population in 2021 [42].

The overall incidence of the population with diseases characterized by high blood pressure (I10-I13) decreased by 2.4% over 5 years from 2017 to 2021 (from 12 081.7 to 11 797.6 per 100 thousand population). Primary incidence, on the contrary, increased by 66.6% (from 851.9 to 1 277.5 per 100 thousand population) [49, 53, 75].

The overall incidence of coronary heart disease (CHD) (I20-I25) decreased by 21.6% (from 8 106.2 per 100 thousand population in 2017 to 6 349.5 per 100 thousand population in 2021), primary incidence increased by 22.3% (from 557.9 per 100 thousand population in 2017 to 699.2 per 100 thousand population in 2021) [43, 58, 146].

The overall and recurrent incidence of acute myocardial infarction (AMI), as well as the primary incidence, increased by 10% (from 60.7 to 65.2 per 100 thousand population, respectively) between 2017 and 2021 [3].

The overall incidence of cerebrovascular disease (CVD) (I60-I69) decreased by 12.6% from 8 294.6 per 100 thousand population in 2017 to 7 247.6 per 100 thousand population in 2021 over the studied 5-year period. In contrast, the primary incidence during the study period increased by 11.2%: from 543.2 per 100 thousand population in 2017 to 626.1 per 100 thousand population in 2021 [19, 20, 49, 81, 102, 94].

In addition, the overall and primary incidence of acute cerebral circulation disorders (I60-I64, G45) decreased by 21.2%, from 165.8 per 100 thousand population in 2017 to 130.0 per 100 thousand population in 2021. The share of primary CVD incidence in the structure of overall incidence is 7.0% (the number of registered patients with cardiovascular diseases per 100 thousand population is 34 300.5, the number of newly diagnosed per 100 thousand population is 2 413.6) [54].

In the structure of incidence of the circulatory system diseases, the first place is occupied by diseases characterized by high blood pressure (37.3%, where 33.7% - hypertensive heart disease (hypertension with predominant heart damage), 3.6% - other). This was followed by CVD (24.9%), CHD (22.8%, where 19.7% were chronic CHD and

3.1% were angina pectoris), and other heart disease - 18.2%. These four groups of diseases account for 97.3% of the overall morbidity both in St. Petersburg and in the Russian Federation [54, 59, 81, 171].

In the structure of primary incidence, the first place is also occupied by diseases characterized by high blood pressure (27.6%, where 23.3% - hypertensive heart disease (hypertension with predominant heart damage). This is followed by ischemic heart disease (23.7%, where 15.8% is chronic ischemic heart disease (CIHD), 5.5% is angina pectoris), CVD (23.1%), and other heart diseases [94, 103, 111].

In St. Petersburg in 2021, compared to 2020, the share of cardiovascular diseases in the structure of overall incidence decreased from 17.6% to 16.1%, while the share of cardiovascular diseases in the structure of primary incidence did not change and amounted to 4.1% [112, 117].

According to Petrostat [117], in 2021, there was a 20% increase in the share of primary incidence in the structure of overall CVD incidence (from 8.6% in 2018 to 10.4% in 2021), whereas for all registered diseases, the increase in the share of primary incidence was only 9.5%; that is, the increase in the share of primary incidence of cardiovascular diseases in 2021 was twice as high, which may reflect both the increase in primary incidence and the increased efficiency of medical check-up [93, 47].

In the structure of CVD incidence (both overall and primary) in St. Petersburg, diseases characterized by high blood pressure are the most common. Hypertensive disease (HD) with predominantly cardiac involvement is the most common. For example, in 2021, there were about 15 new cases of arterial hypertension per 1000 population, which is twice as high as in 2018 [53, 59].

As in the rest of the world, COVID-19 was a particular challenge to the cardiology service in St. Petersburg; it also influenced the rates of overall and primary incidence, as well as mortality [18].

During the observation period from 2017 to 2021, the most favorable situation in terms of CVD incidence was registered in Petrodvortsovy, Pushkinsky, Admiralteysky and Petrogradsky districts [101].

A high level of primary incidence with chronic forms of cardiovascular diseases was registered in Kolpino, Frunzensky, Kalininsky districts; with acute forms of CVD - in Kirovsky, Krasnogvardeysky, Krasnoselsky, Kurortny, Frunzensky districts [59].

1.2 Analysis of mortality rate of the population from cardiovascular diseases in St. Petersburg, the Russian Federation and abroad according to the literature sources (2017-2021)

It should be noted that in Kirovsky, Krasnoselsky, Krasnogvardeysky and Kronstadtsky districts of St. -Petersburg, high incidence rates are combined with high mortality rates from acute and chronic ischemic heart disease with a relatively low population over working age [42, 43, 44, 45, 54].

In the Russian Federation between 2018 and 2020, more than half of all deaths (56.4% and 56.9%, respectively) were due to diseases of the circulatory system. Compared to 2017, in 2018 the mortality rate from circulatory diseases decreased slightly to 583.1 cases per 100 thousand population against 587.6 cases in 2017. In 2019, the mortality rate from diseases of the circulatory system, including CVM, amounted to 573.2 cases per 100 thousand population, and in 2020 - 640.8 cases per 100 thousand population. The main causes of death were ischemic heart disease (48.1%) and cerebrovascular disease (35.8%) [3, 29, 42, 58].

According to the World Health Organization [58], about 3 000 people die of cardiovascular diseases every day in Russia; there are 600 deaths from heart and vascular diseases per 100 thousand population. At the same time, in European countries, mortality rates are three times lower - 200 cases per 100 thousand people [115].

According to the estimates of the European Society of Cardiology, such a high cardiovascular mortality rate classifies Russia as a very high-risk country for cardiovascular diseases. Also, Albania, Algeria, Armenia, Azerbaijan, Belarus, Bulgaria, Egypt, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Macedonia, Moldavia, Syria, Tajikistan, Turkmenistan, Ukraine and Uzbekistan are included in this list [6, 33, 38, 185-205].

In the Russian Federation, an increase in mortality from CVD was observed in 68 subjects. The largest growth was in the Samara region (34%), Penza region (27%), Lipetsk region (26%), Orenburg and Tyumen regions (both regions showed a 25% increase in mortality rates). The indicator decreased in Stavropol region (by 14.9%), the Republic of Karelia (by 14%), and Sakhalin region (by 11%) [1, 31].

In the structure of mortality, diseases of the circulatory system occupy the first place with a share of 46.2%, in the second place – mortality from neoplasms with a share of 15%, in the third – from external causes (7.5%). They are followed by diseases of the nervous system, digestive and respiratory organs [3, 4, 131].

The Ministry of Health cites two main reasons for the increase in excess mortality. The first cause is infectious diseases, including COVID–19, as the main cause of death, or cases of infection affecting the course of the disease (the share in excess mortality is 60%). The second reason is chronic non–communicable diseases (about 40%) [1, 131-141].

According to epidemiologic studies, men are more likely than women to die from myocardial infarction at working age [56].

Despite the achievement of certain positive results [41], mortality from CVD in Russia remains one of the highest in the world, its total economic loss in 2016 amounted to 2.7 trillion rubles per year (3.2% of GDP), while losses due to premature mortality of persons of economically active age predominate in the structure of damage of more than 90% [81]. Against the background of such a high burden of CVD, the need to improve prevention among patients with this pathology becomes obvious [2, 36, 32, 58, 59].

Reduction of mortality from cardiovascular diseases is an important state priority of the Russian Federation: for example, one of the goals of the national project "Healthcare" [129] is to reduce the mortality rate to 450 cases per 100 thousand population by 2024. In order to achieve this target indicator, the Federal project "Combating Cardiovascular Diseases" is currently being implemented [127], within the framework of which measures are taken to prevent and correct risk factors; the system of primary medical and sanitary care for patients is being improved, with the introduction of algorithms for the medical check-up of the population aimed at risk groups; new

effective technologies for diagnosis and treatment are being introduced [36, 42, 59, 75, 89, 112, 119].

1.3 Assessment of the prevalence of cardiovascular disease risk factors in St. Petersburg, the Russian Federation and abroad

The risk of CVD development is closely related to human lifestyle and, first of all, to behavioral risk factors (RF), of which smoking (17.1%), insufficient consumption of fruits and vegetables (12.9%), excessive alcohol consumption (11.9%) and low physical activity (LPA) (9%) make a determining contribution to premature mortality in the Russian population [3, 6, 84, 117, 130, 131].

Smoking is associated with significant social and economic harm due to both premature mortality [11, 12, 23] and increased costs to the healthcare system [13].

The prevalence of tobacco smoking in Russia averaged 27.7% in 2020, which is consistent with the Rosstat data obtained in 2011 in a survey of 19 905 Russians - 25.7% [14]. Tobacco smoking is more prevalent among Russians of 25-34 years old (33.2%), while among 55–64-year-olds only 15.3% smoke tobacco, and in women the age gradient of smoking frequency is clearer than in men [3, 105, 131, 189].

Epidemiological data on the prevalence of smoking are important for monitoring the efficiency of measures used to reduce this risk factor. Currently, the examples of many countries show that the fight against smoking provides positive results – its prevalence is decreasing. Thus, according to the study [16], in 187 countries over the period 1980-2012, two opposite processes were noted: on the one hand, this is a decrease in the prevalence of smoking among both men (from 41.2 to 31.1%) and women (from 10.2 to 6.2%), on the other – a general increase in the number of smokers in since 2006, mainly due to such large countries as Bangladesh, China, Indonesia and Russia [41, 105].

According to WHO data, alcohol consumption in Russia per capita per year at the age of 15 years and older is one of the highest in Europe (15.1 liters of pure ethanol) [23]. Of all alcohol-related deaths, cardiovascular diseases account for 14% [24], and excessive

alcohol consumption is associated with a significant increase in the risk of death in the Russian population [25, 58].

According to the Epidemiology of Cardiovascular Disease study (ESSE), 73.2% of the Russian population consumes alcohol (72.1% of men and 74.1% of women), mainly in moderate amounts, the prevalence of excessive alcohol consumption was only 3.8%, including 6.3% in men and 2.2% in women. All over the world, men consume more alcohol than women [23]. Significant regional variability in alcohol consumption indicators is observed mainly in men [6, 10, 22-31, 64].

The proportion of people who consume alcohol in small quantities decreases with an increase in the level of education, and those who consume moderately increases, however, there is no clear gradient in the characteristics of alcohol consumption depending on the level of education. There were also no significant differences in the frequency of alcohol consumption in connection with the type of settlement among men and women [23, 31, 34].

The volume of alcohol consumption in Russia is declining compared to the end of the XX century, which is due to both social and economic factors and changes in the standard of living of the population, as well as special measures aimed at reducing alcohol consumption. Epidemiological monitoring will make it possible to assess the dynamics of the efficiency of state policy in this area [18, 23].

Low physical activity (LPA) is a significant risk factor for CVD, especially in developed countries [26], which causes up to 3.18 million deaths annually [27]. In 2008, the prevalence of LPA among the population of the USA and the Eastern Mediterranean exceeded 40% [28, 53, 58, 186-205].

The increase in sedentary lifestyles among metropolitan residents is also one of the significant trends observed around the world. According to the Epidemiology of Cardiovascular Disease study (ESSE) [22-31], the prevalence of LPA in the Russian population averaged 38.8%, which is higher than the average prevalence of LPA in the world, which in 2011, according to WHO, was 31%. Among women, the prevalence of LPA was higher than among men (40.8% and 36.1%, respectively). This ratio was

observed in all regions, with the exception of St. Petersburg, which is well in line with global trends in the prevalence of this risk factor [26].

The prevalence of low physical activity varied greatly by region: the lowest prevalence was in Volgograd region and the highest in St. Petersburg (27.9% and 47.8%, respectively) [112, 127, 128].

As for age groups, the highest frequency of LPA was detected in young and middle-aged Russians (25-44 years). According to this risk factor, Russia is closer to developing countries in Asia, where people over the age of 60 are the most active, whereas in most Western countries the the greatest activity is observed in young and middle aged [26, 77, 78, 80].

The prevalence of LPA in Russia has increased in recent years (according to WHO, in 2018 this indicator was 20.8%) and turned out to be higher than in a number of European countries [28, 29, 54, 83].

Nutrition is a powerful factor affecting the human body throughout life, which can become both a factor for the development of chronic diseases and a significant protective measure [11]. It has been shown, for example, that a Mediterranean diet rich in olive oil, fresh vegetables and fruits, as well as fish, reduces the frequency of cardiovascular events among people with high cardiovascular risk [30].

According to WHO estimates, about 1/3 of all CVD occur due to malnutrition, which is usually characterized by excessive consumption of animal fats against the background of insufficient consumption of fruits and vegetables. Previous studies [31, 189, 225, 230, 233] support the role of vegetable and fruit consumption in reducing the risk of CVD and cancer. Regular consumption of vegetables and fruits in the recommended amounts is associated with a 42% reduction in the risk of death [32].

The analysis of the frequency of consumption of vegetables and fruits revealed a significant age gradient. The prevalence of this factor decreases significantly with increasing age. Thus, in the group of people aged 25-34, about 1/2 consume an insufficient number of vegetables and fruits, whereas among people aged 55-64 - only about 1/3 [76, 95].

Insufficient consumption of fruits and vegetables requires the implementation of special correction measures and monitoring of their efficiency.

To date, there is strong evidence between excess salt intake (>5 g/day) and risk of CVD [38]. Diseases associated with excessive salt intake cause up to 3.1 million deaths per year in the world [28]. A number of epidemiologic studies [39, 92, 93] have shown that reducing salt intake has an effect on lowering blood pressure at the population level [22-35, 95, 100, 163, 189, 233].

Biological risk factors such as arterial hypertension (AH), dyslipidemia, overweight, obesity, and diabetes mellitus can be formed when the human body is exposed to behavioral risk factors for a long time [43, 58].

In recent years, the role of psychosocial factors such as low education and income, low social support, psychosocial stress and the development of anxiety or depression has been extensively discussed. Moreover, the contribution of the latter to the development of CVD is the least [23, 26, 19, 48].

Early detection and timely correction of such modifiable risk factors of cardiovascular diseases as high blood pressure, hypercholesterolemia, hyperglycemia, tobacco smoking, excessive body weight and obesity, low physical activity prevent the progression of CVD, the development of their complications and prevent premature mortality caused by them [2, 6, 58, 108, 123].

All of the above indicates a high mortality rate, a wide prevalence of cardiovascular diseases and risk factors for their development throughout the world; however, these phenomena also have their own regional characteristics. Analysis of the dynamics and trends of the main health indicators of the population and identification of risk factors for the development of diseases are necessary to determine approaches to improving the provision of medical care.

1.4 Modern approaches to the prevention of cardiovascular diseases in the Russian Federation as part of a high-risk strategy

In addition to studying risk factors for disease development [99], effective preventive measures are being implemented in the Russian Federation.

At the moment, the following prevention strategies have been identified: *population-based, high-risk strategy, secondary prevention strategy*.

The population-based prevention strategy is primarily aimed at fostering healthy lifestyles among members of society, promoting knowledge about health preservation, and broad information work with the population regardless of whether they have risk factors or chronic non-communicable diseases. The role of the family physician in the implementation of a population-based prevention strategy is to actively inform and motivate the population to lead a healthy lifestyle and seek medical advice in the presence of risk factors. The leading role in conducting population-based strategies among medical professionals belongs to the Centers for Medical Prevention [96, 99, 103, 106].

The high-risk strategy consists of timely identification of persons with an increased level of risk factors and measures to correct them; prevention of the progression of chronic non-communicable diseases through the correction of risk factors and timely treatment and rehabilitation measures; promotion of a healthy lifestyle at the level of the entire population and provision of appropriate conditions [76, 107, 109].

Secondary prevention focuses on work with groups of patients with disease to prevent disease progression and the development of complications [41, 99, 105, 134, 160].

Assessment of the risk of cardiovascular diseases

Screening methods of examination are used to identify risk factors. There are opportunistic screening and selective screening.

Opportunistic screening is performed at any visit to a medical organization.

Selective screening involves examining patients who have a high probability of having risk factors (for example, examining obese patients to detect hypertension).

Since CVD is considered as disease with multifactorial etiology, and the potentiating effect of risk factors on their development is currently undisputed, a total cardiovascular risk scale has been developed, which is based on the consideration of a set of certain risk factors [39, 50].

Determination of total cardiovascular risk is recommended for primary and secondary prevention of CVD, including during the medical check-up of certain age groups and preventive medical examinations [84, 89, 91, 138].

Total cardiovascular risk is proposed to be determined using the European SCORE scale, developed to assess the absolute risk of fatal cardiovascular complications in the next 10 years of life. Fatal cardiovascular complications include death from myocardial infarction, other forms of coronary heart disease (CHD), and stroke [63, 76, 105].

It is important that any time a patient seeks medical care, opportunistic screening for cardiovascular risk factors should be performed and the cumulative cardiovascular risk of developing fatal complications in the next 10 years of that patient's life should be determined [84, 105].

If we discuss the possibilities of primary prevention of cardiovascular diseases, then such work should be focused primarily on behavioral risk factors for the development of CVD. According to World Health Organization data in 2015, more than 75% of CVD deaths could have been prevented by correcting risk factors and changing the lifestyle of such patients [34, 57, 73-80].

Taking into account that behavioral risk factors are more often formed in adolescence with subsequent consolidation in adult lifestyle, preventive work should start precisely from adolescence, informing adolescents about the dangers of a particular habit, motivating them to give it up and in every possible way approving the choice of a healthy lifestyle [68, 154, 152].

The correction of behavioral risk factors is an independent area of population-based prevention and requires concerted efforts based on the cooperation of various sectors as well as the healthcare system. Effective correction of behavioral RF on a population scale has become one of the key ways to significantly reduce mortality observed in Western countries in the XX - XXI centuries [36, 54, 135, 140, 142, 154-165].

Planning of preventive programs at the population level and organization of effective preventive activities of primary health care requires detailed and reliable information on the prevalence of CVD risk factors. Until recently, this information was practically not reflected in official statistics, but since 2013, data on the frequency of occurrence of risk factors have been collected in the reporting forms on medical check-up (f-030/u, f-131/u). At the same time, it has been proven that reliable information on the prevalence of risk factors can be obtained only in epidemiological studies [73, 74, 124].

The main preventive mechanism of medical care in the healthcare system of the Russian Federation is two-stage medical check-up of certain groups of the adult population with subsequent regular medical check-up (RMC) with the priority of early detection of major chronic non-communicable diseases (NCD) and risk factors for their development, primarily cardiovascular diseases [6, 15, 16, 17, 45, 177].

Medical check-up (examination) is a scientifically based set of medical measures aimed at screening of NCD and conditions that are the main cause of disability and premature mortality in the population of the Russian Federation, risk factors for their development, and the risk of using narcotic drugs and psychotropic substances without a physician's prescription. In addition, the measures within the framework of medical examination are aimed at determining the health group, the necessary preventive, therapeutic, rehabilitative and health-improving measures, conducting preventive counseling of citizens with identified NCD and risk factors for its development, determining the group of regular medical check-up [48, 124, 129].

The analysis of the results of the first years of medical examination of certain groups of the adult population, carried out in 2016, showed the high practical significance of complex methodology in the detection of CVD and their risk factors, and also outlined the need to improve a number of directions of preventive tactics [61, 140, 142]. The results confirmed the importance of continuous monitoring of the volume and quality of medical examinations at the level of each specific medical organization (MO) providing primary health care (PHC) with an emphasis on the active participation of general practitioners (GP), primary care physicians, and nursing personnel. Their tasks include

attracting the population to medical examination and follow-up for the purpose of early detection of CVD and risk factors for their development [60, 62, 158, 159, 165, 167, 168].

Currently, as part of the medical examination, a high-risk preventive strategy is being implemented, based on the identification of persons who are healthy according to formal signs, but have a high multifactorial risk of developing CVD, as well as the identification of patients with cardiovascular diseases in order to manage risk factors to reduce the likelihood of developing adverse cardiovascular complications (CVC) [61, 148]. This strategy is based on the concept of total cardiovascular risk (CVR), which is due to the multi-factorial etiology of cardiovascular diseases and the interaction of their risk factors. Thus, according to the INTERHEART study, correction of nine easily measurable and potentially modifiable CVD risk factors reduces the risk of acute myocardial infarction (AMI) by 90% [177].

The SCORE (Systematic COronary Risk Evaluation) scale, developed on the basis of data from 12 European cohort studies, is designed to assess the absolute risk of fatal cardiovascular complications in the next 10 years of life in the European population [52, 53, 123]. This scale evaluates the risk of any fatal CVD of atherosclerotic genesis, but does not account for non-fatal events. Risk factors used in SCORE include age, gender, TC, ratio of TC to high-density lipoprotein (HDL), systolic BP (SBP) level, and tobacco smoking. A unique aspect of the SCORE system is the availability of separate risk scores for high and low cardiovascular risk (CVR) regions in Europe [21, 52, 108, 112].

Since the cumulative CVR differs between populations, risk prediction systems based on data from one population may not be as accurate for individuals from another population. The SCORE scale is not used in patients with proven cardiovascular diseases of atherosclerotic genesis (coronary heart disease (CHD), CVD, aortic aneurysm, peripheral arterial atherosclerosis), type I and II diabetes mellitus (DM) with target organ damage, chronic kidney disease, in individuals with high levels of individual risk factors, in individuals aged over 65 years (these groups of individuals have the highest 10-year cumulative CVR) and in individuals under age of 40 [15]. At the same time, the practice of using the SCORE scale in the Russian Federation shows that its use often underestimates the actual cardiovascular risk in patients with low and moderate

cardiovascular risk [11]. The problem is aggravated by the fact that in most cases it is impossible to assess the efficiency of prevention of adverse CVM in patients of health group IIIa (traditionally, the emphasis is placed on health group II), since calculation of the total CVR according to the European SCORE scale in this category of patients shows a very high absolute CVR [2, 42, 60, 66, 68, 190].

Within the framework of this strategy, since the beginning of the XXI century a preventive network of "Health Schools" has been organized in the Russian Federation. The main objectives of their work are to inform the population about the deleterious effects of CVD risk factors (including obesity) and to form motivation for a healthy lifestyle [6, 23, 29, 35, 51, 77, 122, 124, 156, 162].

Thus, the search for new approaches to improve cardiovascular disease prevention in the course of medical examination and dynamic monitoring of patients of health groups II and IIIa is becoming an extremely urgent task.

Medical examination of patients with cardiovascular diseases

Since 2012, the importance of preventive measures implemented within the framework of the medical examination program has significantly increased in the activities of primary health care, which led, according to the data of the Ministry of Health of the Russian Federation for 2013-2015, to an increase in the detection of diseases by 7.5 times [2, 6, 30, 31, 35, 62].

Currently, general practitioners and primary care physicians have incomplete information on the number of patients with NCD in their sites, both due to overload and regional peculiarities. In fact, there are from several dozens to 400 people under dynamic observation at one site [123, 127].

Since 2005, the implementation of global national projects in the field of education, housing, agriculture and healthcare, initiated by the President of the Russian Federation V.V. Putin was launched. An active modernization of the healthcare system was reflected in the improvement of primary health care and the prevention system (Fig. 1.1).

Modernization included: introduction of modern information technologies; upgrading the material and technical base of medical organizations; introduction of

standards of medical care. This stage ensured an increase in the availability of primary health care, including preventive care.

The fundamental legislative and regulatory documents adopted during this period (Federal Law No.323-FZ dated 21.11.2011 "On the basics of protecting the health of citizens in the Russian Federation" and Order of the Ministry of Health and Social Development of Russia dated 15.05.2012 No.543n "On approval of the Regulations on the organization of primary health care for adults") reflected the results of the reorganization of primary health care [129, 149].

The Decree of the President of the Russian Federation dated 07.05.2018 No.204 "On National goals and strategic objectives of the development of the Russian Federation for the period up to 2024" defined the achievement of such national goals of Russia as ensuring sustainable natural population growth and increasing life expectancy to 78 years (and to 80 years by 2030), including by improving medical care in outpatient settings and prevention of chronic non-communicable diseases.

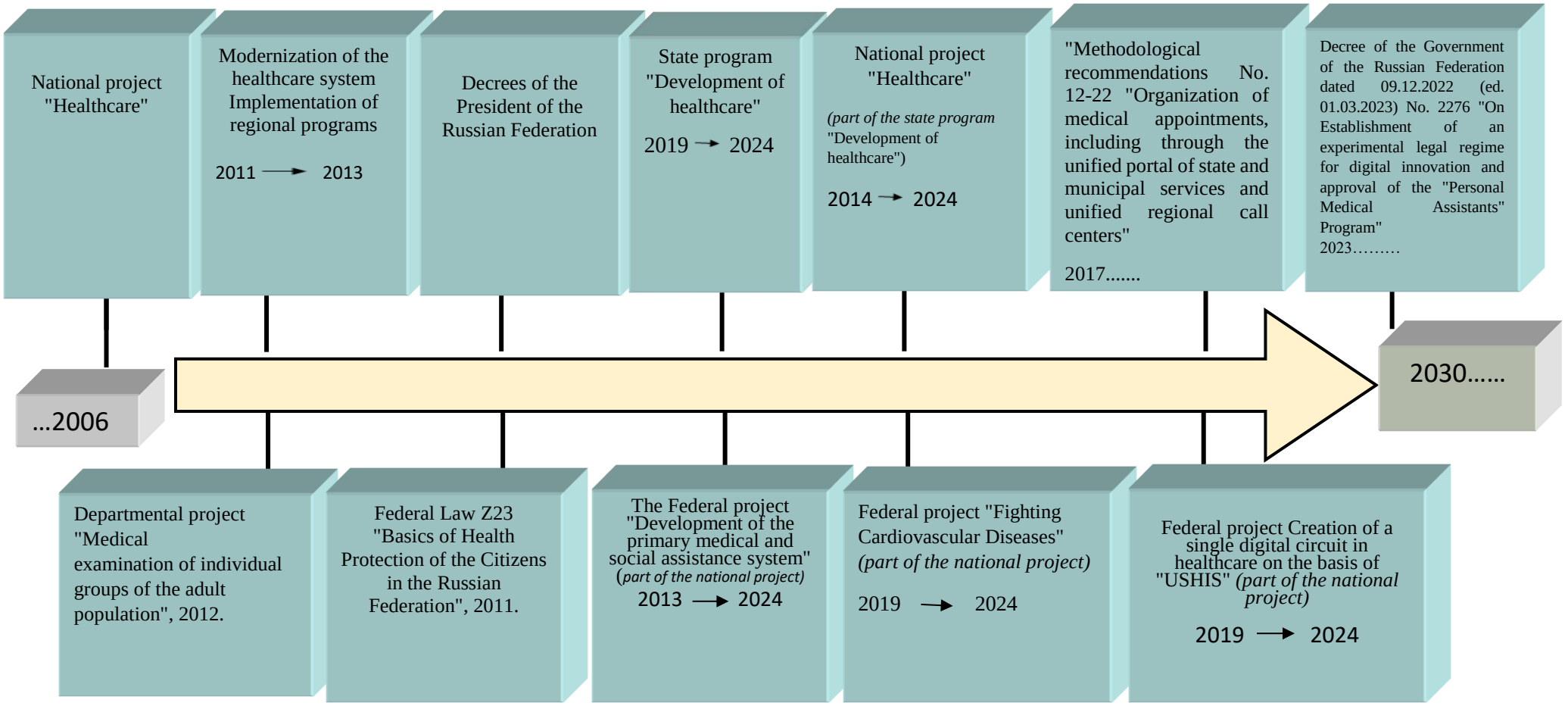

Figure 1.1 - State approach to the prevention of cardiovascular diseases in the Russian Federation

In 2013, medical examination of the adult population was resumed on the basis of the Order of the Ministry of Health of the Russian Federation dated 03.12.2012 No.1006n "On approval of the procedure of medical examination of individual groups of the adult population".

The State Program of the Russian Federation "Development of healthcare", approved by the Government of the Russian Federation in 2017, set goals to reduce the mortality rate of the working-age population to 350 deaths per 100 thousand population by 2024 and to reduce the mortality rate from diseases of the circulatory system to 450 deaths per 100 thousand population by 2024. Part of the State Program is the national project "Healthcare", which includes eight federal projects as structural elements, including the projects "Development of the primary medical and social assistance system" and "Fighting Cardiovascular Diseases". The "Fighting Cardiovascular Diseases" project is scheduled to run from 2019 to 2024.

Since 2020, within the framework of this Federal project, measures are being implemented to prevent cardiovascular diseases and cardiovascular complications in patients with a high risk of their development who are under medical observation. Within the framework of the project, medical observation and provision of persons who have suffered acute cerebral circulatory disorders (myocardial infarction and other acute cardiovascular diseases) with medications on an outpatient basis is provided. According to the project, optimal accessibility of medical care should be ensured in all regions of the Russian Federation, including remote settlements. This will allow patients to receive quality medical care in a timely manner, undergo preventive medical examinations and check-ups.

1.5 The role and place of telemedicine technologies in providing medical care to patients with cardiovascular diseases

Affordability, equity, quality and cost-effectiveness are key issues facing health care in both developed and developing countries. Modern information and communication technologies (ICT), such as computers, the Internet and mobile phones,

have revolutionized the ways of communication, as well as the search and exchange of information, which has made people's lives richer. These technologies have a huge potential in solving modern global health problems [116, 137, 146, 166].

In the World Health Organization, the term "telemedicine" is defined as "a complex concept for systems, services and activities in the field of healthcare that can be remotely transmitted by means of information and telecommunication technologies for the development of world health, disease control, as well as education, management and research in the field of medicine". Telemedicine is a fairly new and relevant area that plays an important role in the modern healthcare system of any country in the world, since there are significant territories around the world where infrastructure is completely undeveloped [187, 189, 194, 214].

The advantages of telemedicine are to enable specialists of the world's leading medical institutions to exchange various medical information with regions and institutions with an insufficient number of highly qualified physicians, to improve the quality and level of diagnostics, to conduct continuous effective theoretical and practical training, to treat patients at a distance from medical personnel with the necessary qualifications, using various modern computer and telecommunication technologies. Another advantage is the reduction in the cost of health services for the population while improving the quality of their provision [88, 97, 99].

The fields of telemedicine application can be divided into 2 main types, depending on the timing of information transfer and the interaction between those involved, whether it is communication between medical specialists or between physician and patient. Asynchronous telemedicine employs the exchange of pre-recorded data between two or more individuals at different times. Synchronous telemedicine is performed in real time and requires the simultaneous presence of those involved in the interactive information exchange process (e.g., videoconference) [2, 115, 138, 175, 214].

Most developed countries of the world, like Russia, are focused on improving the technologization of all types of medical care. In the healthcare system, these processes are called "digital medicine" and "digital healthcare" [144, 136, 170].

Prerequisites for the digital transformation of healthcare:

- scientific and technological progress: advances in the development of science and technology in medicine, molecular biology, computer science and the growth of computing power provide new effective methods and tools for diagnosis and treatment;

- global informatization and mobility: people are no longer limited by geographical barriers in communication, and actively use the Internet, mobile devices, social networks and applications to communicate at a convenient time;

- patient centricity: a modern person leads a healthy lifestyle, and as a patient makes decisions on voluntary health monitoring, actively participates in data collection, familiarization with information resources, chooses the attending physician and treatment strategies;

- data centricity: an abundance of data on the health status of citizens; analytical tools for decision making are created on the basis of these data [50, 187, 188].

In order to understand how to carry out the digital transformation of healthcare as efficiently and effectively as possible, it is necessary to act in a single conceptual space, not allowing technological aspects to obscure meaningful ones. It is necessary to adhere to the basic concepts of the digital economy as a whole, recommendations from international experience and the first results of Russian practice and current laws. The fundamental document to date is Federal Law dated 29.07.2017 No.242-FZ "On amendments to certain legislative acts of the Russian Federation on the use of information technologies in the field of health protection".

In accordance with this law, digital medicine is defined as a system of scientific knowledge and practical activities for the diagnosis, treatment and prevention of diseases, preservation and strengthening of health and working capacity of people, prolonging life, as well as alleviating suffering from physical and mental ailments based on a digital healthcare platform that accumulates, supports and develops a system of scientific knowledge in the field of medicine and access to medical services based on information and communication technologies. It is the result of the digital transformation of medicine [90, 95, 158, 161, 163].

Digital medical care as a type of medical care provided using digital medical services, including at a distance, using telemedicine technologies and remote exchange of clinical data between a patient and a medical specialist, using mobile devices and associated wearable personalized medical devices, using analytical decision-making systems based, inter alia, on big data processing; relies on existing and developing information systems in healthcare, including the storage of health information and the exchange of digital medical records about patients (integrated electronic medical records – IEMR) [85, 166, 170, 171].

Digital medical services are services to support medical activities and scientific research in medicine, focused on the consumer (patient, physician, scientist, supporter of a healthy lifestyle). They are provided locally on the principles of accessibility, timeliness, quality and convenience, using any digital devices and communication channels, as well as data accumulated in information resources of state and municipal health systems and in private information resources.

The digital healthcare platform is a set of approaches to digital transformation, principles of digital medicine, methods of unification and standardization, as well as requirements for interoperability and security [70, 71, 85].

Based on the experience of supranational associations, the practice of the European Union is of maximum interest to Russia. Now the work is being carried out within the framework of the action plan for 2012-2020 "Innovative healthcare for the 21st century" [116], but it should be recognized that for the purposes of using European developments, more attention should be paid to the previous plan of 2004 [138] – it is the most relevant to the current state of Russian healthcare. The results of Europe are also interesting as a possible model for the Eurasian Economic Union [70, 71].

Among the results of studies by other international organizations, let us highlight the review "White Paper. Digital transformation of industries. Healthcare" [142], prepared in 2016 By the World Economic Forum in cooperation with the Accenture consulting company. The authors of this document, as well as various consulting companies, medical organizations conducting research and implementing practical projects in the field of digital medicine, demonstrate which methods, practices and

technologies contribute to the digital transformation of healthcare. It should be noted that the countries in which medicine and (or) insurance are a developed business are leading in digital transformation. Digital technologies provide companies operating in this market with competitive advantages, and their organizational and financial capabilities allow them to introduce innovations nationwide [171].

In the federal segment of the Uniform State Health Information System (USHIS), many federal registers have been formed, an electronic registry has been implemented, and the maintenance of regulatory and reference information has been organized. Data related to the IEMR is being collected. It is very important that international standards for the exchange, management and integration of digital medical information, officially approved as the national standard of the Russian Federation – GOST R ISO/HL7 27932-2015 "Informatization of health. Data exchange standards. HL7 clinical document architecture. Issue 2" are used [138].

Over the past two years, the medical and expert community has been intensively discussing draft laws that have received the general name "On telemedicine" in the media. There were many reasons for such attention, not only the intrigue surrounding the conflict of different approaches, but also the general interest in the lagging digital transformation of healthcare, the urgent need to codify emerging relationships, and the demands of a growing healthcare business. And now the Federal Law dated 29.07.2017 No.242-FZ "On amendments to certain legislative acts of the Russian Federation on the use of information technologies in the field of health protection" was adopted.

The first thing to note is that the main message of the law is not connected with telemedicine technologies at all, but with electronic medical document management. All patient-related documents, including prescriptions for drugs, can be created, stored, transmitted and processed electronically from 2018-2019, and also protected from new types of threats.

The second thing that the new law provides is the legalization of the already existing situation with the Unified State Information System in the sphere of healthcare. Now it will become an electronic medical archive of the whole country. Here, in accordance with the regulatory framework, integrated electronic medical records, a

register of medical documentation and the directories and classifiers necessary for their maintenance will be centrally maintained. Obviously, patient data with their consent should eventually become available to physician to ensure continuity of treatment, and depersonalized data should be the basis for analyzing population trends, creating and training medical decision support systems. The task of science is to learn how to coordinate and understand them [137, 138, 158, 165].

And only the third point is the possibility of providing medical care using telemedicine technologies. It should be noted that the law introduced restrictions on the provision of this type of assistance: for example, it is impossible to diagnose remotely, and correction of previously prescribed treatment is possible only if the diagnosis is established and treatment is prescribed by the same physician at a full-time appointment. For remote monitoring, "medical devices designed to monitor the state of the human body" should be used [71].

According to the World Health Organization, there are more than 7 billion mobile phone users in the world. Unlike PCs and laptops, mobile phones are the most "personal" devices used on a daily basis. Mobile phones are configured according to individual preferences. The technical capabilities of cell phones and their proximity to the person make it possible to receive information about the patient's condition in real time. Embedded sensors, such as global positioning system sensors (GPS receivers), will allow mobile applications to track where the user is and what they are doing. This information enables real-time support for patients, ensuring that they get help when they need it. Such assistance can be aimed at reducing the prevalence of an unhealthy lifestyle, remote diagnosis and treatment support [20, 114].

Mobile health programs can be divided into campaigns based on communicating with users via SMS messages, campaigns based on using devices connected to mobile applications or in phones, and various combinations of these types [70, 71].

Mobile healthcare provides constant communication between physicians and patients. Two directions can be distinguished in this direction: teletraining, which allows timely informing medical professionals about the patient's condition, and remote monitoring of disease symptoms [70, 71, 144, 169].

In the Russian Federation, pilot projects on the use of telemedicine technologies with remote monitoring of blood pressure in patients with arterial hypertension are being implemented in various regions within the framework of the state project "Development of Medicine until 2025".

The first positive results of changes in medical and social indicators have been published at a cost significantly lower than the costs required to obtain the same indicators by traditional methods, without the use of telemedicine technologies. This is the effectiveness of the use of telemedicine technologies. In particular, cost optimization is achieved by varying and expanding the volume of primary health care according to criteria that ensure the type and nature of primary health care that corresponds to the level of incidence, needs and expectations of the population [67, 70, 71].

According to the results of studies conducted in a number of regions of the Russian Federation in 2012-2019, the efficiency of telemedicine technologies has been proven in both urban and rural areas. The use of these technologies made it possible to stabilize blood pressure in patients in 80% of cases and prevent hospital admission for unstable hypertension in 98% of cases. In addition, the duration of BP normalization in outpatients was reduced from 14 to 9 days, and the number of visits to the emergency station was reduced by 96% [43, 156].

In these areas, the incidence of CVD decreased, mortality from circulatory diseases (CVD) decreased by 4.1%, and satisfaction with the quality and availability of health care increased significantly, including in rural, remote, and hard-to-reach areas [43, 137, 156, 192]. This has the potential to significantly increase the proportion of hypertensive patients monitored for drug dispensing and substantially improve the efficiency of antihypertensive therapy. The expected benefits of this practice are a reduction in the number of calls to the ambulance service, a reduction in the number of lost workdays and thus complications (stroke and myocardial infarction) and, consequently, a reduction in mortality from cardiovascular disease [43, 70, 137, 165].

Methodological recommendations No.12-22 approved instructions on the sequence of actions, approaches and time frames for creating and maintaining an appointment schedule, patient regimen when making an appointment with a physician (including home

environment), as well as the list and order of interaction between the participants of the process. This has been driven by the need for continuous improvement and advancement of medical science and practice, which requires physicians to spend more time on learning and self-improvement but reduces the available time for receiving patients [25, 30, 120].

To address this problem, it is proposed to firstly optimize physician schedules and secondly, to use information technology to improve patient admission and data management. Third, delegating some medical personnel to other members of the medical staff can help free up physician’s time for more complex cases. Such organizational solutions will help to increase the availability and quality of medical care [13, 37, 43, 66, 70].

During low flow hours, it is suggested that physician schedules be optimized. By analyzing the patient admission process, it is possible to identify the periods of the greatest workload when more physicians are needed. Then, using this data, additional resources can be provided. Flexible scheduling will allow the workload to be evenly distributed and meet the needs of patients during different hours. Methodological recommendations "Organization of the system of doctor's appointments using the Unified Portal of State and Municipal Services and the Unified Regional Contact Center" [1, 13, 18, 32, 37, 39, 43, 44, 66, 84, 121, 124, 131, 135, 137, 145, 146, 173, 174, 181, 186, 192, 198] are designed to standardize the processes of compiling, updating and maintaining schedules in medical organizations providing primary medical care, as well as to improve the process of doctor's appointment [131, 135, 137, 145, 146, 173, 174].

The second solution is related to the effective use of information and communication technologies. For example, a digital patient management system can help doctors to optimize working hours. An online appointment system will simplify the planning and organization of patient appointments, as well as reduce waiting times. More convenient access to electronic medical records will save time on data preparation and processing [101, 102, 114, 138, 141, 142, 149, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169]. In addition, it is important to use technologies and information systems rationally in order to reduce the time spent on routine tasks and improve the efficiency of doctors.

The third solution is related to the delegation of some medical functions to other categories of medical personnel. For example, nurses can perform certain procedures, freeing up doctors' time for more complex cases. It is recommended, for example, that general practitioners be exempted from public health education, maintaining a patient health information database and site records. In addition, nursing personnel with paramedical training can help with lists for medical examinations and preventive screenings. Non-medical personnel can be assigned to patient record keeping and other tasks, including obtaining lab results and entering information into medical records. Specially trained medical assistants can also help doctors with administrative tasks [101, 102, 137, 166, 167, 171, 176].

The use of organizational solutions for doctors in the process of receiving patients is an important step in ensuring the availability and quality of medical care. An integrated approach, including an effective time management system and advanced technology, achieves this goal.

Approved by the Decree of the Government of the Russian Federation the Program of the Experimental Legal Regime (ELR) in the sphere of digital innovations in medicine [120], provides for the development and implementation of personal medical assistants for the collection, processing and storage of information about the state of health and diagnoses of citizens. These assistants will be responsible for receiving, processing and transmitting data to medical information systems of organizations. This is a measure aimed at implementing the initiative of social and economic development of the Russian Federation and improving medical activities using new technologies.

Since the beginning of 2023, Russia has launched a pilot project on remote monitoring of patients' health using high-tech devices and services. An experimental legal regime in the field of telemedicine approved by the Government of the Russian Federation [38, 67, 71, 83, 84, 102, 114, 138, 141, 142, 149, 159] has begun to operate.

The pilot project involves the use of modern technologies to determine and monitor the health indicators of patients at a remote distance. This includes the use of various high-tech devices such as wearable sensors and medical devices that enable continuous monitoring of basic vital health indicators such as heart rate, blood pressure, blood oxygen

levels and others. The collected data is then transmitted via telemedicine services to medical organizations that analyze and diagnose patients.

The project involves both private medical organizations that provide remote health monitoring services to patients, and public medical institutions that provide consultations and feedback to patients. This significantly improves accessibility and quality of care, especially for patients in remote areas with limited ability to visit a doctor in person. The basic principle of such a system is to routinely collect data on a patient's health status, transmit it to medical professionals, and receive feedback that includes detailed recommendations for treatment and health management [114, 138, 141, 142, 149, 159, 167, 174, 175, 179, 180, 185, 186].

The pilot project on remote monitoring of patients' health status is part of the strategy of telemedicine development in Russia and gives an opportunity to determine the efficiency and prospects of such approaches. The results obtained and the experience of the system can be used to expand the use of telemedicine in medical practice and provide better and affordable care to patients [67, 71, 83, 84, 102, 114, 138, 141, 142, 149, 159, 167, 174, 175, 179, 180, 185, 186].

Thus, based on the analysis of literary sources, it seems important to note that the improvement of the legislative and regulatory framework in the healthcare system will ensure accessibility and quality of medical care.

The active introduction of new advanced information and communication technologies into the primary health care system requires different approaches to improving the organization of medical care in outpatient settings. One of such approaches is the use of structural and functional technology with the application of remote blood pressure monitoring in the organization of medical care on the basis of redistribution of functional responsibilities of medical professional and participatory interaction with patients.

CHAPTER 2 MATERIALS AND METHODS

2.1 Study organization

The present work is a comprehensive pre-experimental, randomized study performed during 2017-2022 in accordance with the standards of clinical practice (Good Clinical Practice) and the principles of the Declaration of Helsinki, and with the approval of the Ethical Committee of St. Petersburg.

The theoretical and methodological basis of the thesis was formed by scientific works of domestic and foreign authors in the field of health care organization and public health. The work was carried out taking into account the principles of objectivity and consistency. In the course of the work, modern methodological approaches to research in the field of public health, the organization of health sociology, medical and social expertise adapted to the specifics of the topic of the dissertation work were used.

The following general scientific methods were used in the research process:

theoretical – analysis, synthesis, abstraction, analogy, deduction, abduction, induction, modeling*;*

empirical – observation, description, experiment, testing.

It is worth paying attention to *specific methods*, to which we can refer the analysis of text arrays, retrospective analysis, comparative analysis, grouping and data systematization.

The main provisions of the thesis research are based on systems theory and its consequences.

At the beginning, a step-by-step research plan was drawn up, the object and subject of the study were determined, and the time and place of the study were indicated. After determining the hypothesis, the methodology of material collection and processing,

algorithm and structural and logical scheme of the study (hereinafter - design) were specified.

In order to achieve the research goal and solve the tasks set, we have developed a design illustrating the stages of the study (Table 2.1).

The first period of the first stage of the scientific research, carried out using the method of content analysis, was carried out for 5 years on the material of the following domestic and foreign journals, electronic databases: RSCI abstract database; PubMed; MedLine; Scopus; Google Academy; WorldWideScience; funds of the Central Research Library of the Russian Academy of Sciences; RNB; libraries of the Russian Academy of Sciences.

Monographs, scientific articles, conference materials, regulatory and legal documents are analyzed, medical and social approaches to the organization of medical care for patients with cardiovascular diseases are described. The prevalence of cardiovascular diseases and risk factors for their development in the Russian Federation, St. Petersburg and abroad was studied on the basis of 20 official documents, 184 scientific publications of domestic scientists and 32 foreign ones. Modern approaches to the prevention of cardiovascular diseases, including the use of telemedicine technologies, are described.

Table 2.1 - Structural and logical scheme of the study (design)

No.	Research stage	Research methods	Sources of information	Scope of observations
1	Analysis of medical and social approaches to the organization of medical care for patients with cardiovascular diseases.	Descriptive Analytical	Regulatory documents, articles, monographs, annual reports on the activities of medical organizations.	domestic (184) and foreign (32) scientific literature; regulatory legal acts on the subject of the study (20)
	Analysis of risk factors for arterial hypertension in patients of working age within the work of the arterial hypertension prevention cabinet.	Retrospective-analytical, observation	Electronic database of the arterial hypertension prevention cabinet "Cardiometer-MT" primary documentation F-030/u.	807 cases of observation.
	Development of a scheme and plan	for the implementation of structural and functional technology for the organization of medical care with the use of remote blood pressure monitoring, taking into account the redistribution of functional responsibilities of medical personnel and participatory interaction with patients in outpatient settings.		
2	Organization and application			
	Conducting a sociological study: -patients of working age; - medical personnel.	Survey	Questionnaires for patients.	200 questionnaires for patients
			Questionnaires for primary health care personnel.	101 questionnaires for medical professionals.
3	Substantiation of medical and social efficiency of remote blood pressure monitoring as the main element of structural and functional technology with the use of.	Statistical	Indicators of systolic (SBP) and diastolic (DBP) blood pressure	Results of 3000 blood pressure measurements of 250 patients of working age.
		Analytical	Questionnaires for patients.	200 questionnaires for patients 101 questionnaires for medical professionals.
	Development of proposals for improving the provision of medical care with the use of remote blood pressure monitoring, taking into account the redistribution of functional responsibilities of medical personnel and participatory interaction with patients in outpatient settings.			

In the second period of the first stage of the scientific study, a retrospective analysis of risk factors for the development of arterial hypertension in persons of working age was conducted on the basis of annual reports of medical organizations for 2014-2018. The sources of information were:

- reporting forms of primary medical documentation of St. Petersburg state budgetary health care institution "City Polyclinic No.19" and St. Petersburg state budgetary health care institution "City Polyclinic No.91" for 2014-2018, "control card of regular medical examination" (f-030/u) (*3500 cases*);
- electronic database of activities of the arterial hypertension prevention cabinet "Cardiometer-MT" (*807 cases*).

Assessment of the risk of cardiovascular mortality within 10 years according to the SCORE scale is based on five factors: gender, age, smoking, systolic blood pressure (hereinafter - SBP) and total cholesterol (hereinafter - TC). For patients aged 39 years, relative cardiovascular risk is calculated, which can motivate younger patients to make necessary lifestyle changes (by demonstrating risk reduction, such as quitting smoking, etc.), while absolute cardiovascular risk is calculated for those over 40 years of age.

For patients over 65 years of age, the SCORE scale is not used because they are considered to be automatically categorized as high and very high cardiovascular risk, therefore they need active measures to reduce the levels of all risk factors. The SCORE scale is simple and easy to use for both patients and medical professionals.

It is used in two versions: one for countries with low, the other for countries with high and very high levels of cardiovascular mortality. For the Russian Federation, the second version is recommended for use.

The monitoring and analysis of the health status of patients with arterial hypertension with identified risk factors for the development of cardiovascular diseases and functional disorders of the cardiovascular system was carried out.

A scheme and a plan of implementation of structural and functional technology of organization of medical care with the use of remote blood pressure monitoring in

outpatient settings with regard to redistribution of functional responsibilities of medical personnel and participatory interaction with patients were developed.

Additional conditions were created for obtaining information about risk factors for the development of diseases. On the websites of SPb GBUZ "City Polyclinic No.19" and SPb GBUZ "City Polyclinic No.91" online work of "Schools of remote blood pressure monitoring" was organized and information materials were posted (Appendix C).

The main structural and functional element of organizational and functional technology in outpatient settings is remote monitoring of blood pressure in patients of working age with arterial hypertension, which is based on the evidence of medical and social efficiency. The organization and monitoring were carried out at the second stage of scientific research.

Criteria on the basis of which patients were included in the study: individuals with arterial hypertension (hereinafter - AH), age from 18 to 65 years, signed consent to informing, regular medical check-up for AH, absence of severe concomitant pathology (diabetes mellitus, liver cirrhosis class B and C on the Child-Pugh scale, chronic kidney disease with a glomerular filtration rate <30 ml/min/1.73 m2, severe bronchial asthma, active malignant diseases, mental illness). Patients were familiarized with the terms and conditions of the study and signed a consent to participate in it.

Technical support.

Remote patient monitoring devices allow caregivers and self-monitors to record, monitor, analyze, and ultimately manage acute or chronic conditions. The software product platform and health monitoring diary applications are compatible with hundreds of smart medical devices.

After consultation with the attending physician, a decision was made jointly with the patient to be included in the study. Patients used personal smart medical devices, and for the period of observation they were given electronic automatic tonometers of the same model with the possibility of remote transmission of measurement results via Bluetooth and mobile application - "by pressing one button on the device", which is extremely important for elderly people and patients with cognitive impairment.

The measurement method is oscillometric, the accuracy class is A/A. It is worth clarifying that patients received a link to download this application and were trained on how to use it for manual transmission of measurement results. The mobile application was a form with three fields for entering systolic BP (SBP), diastolic BP (DBP), and heart rate. The method of remote transmission of the received data of blood pressure measurements is reflected on the doctor's computer using an automatic tonometer, transmitted in encrypted format to the remote monitoring center and stored in a cloud database.

The program is recommended for patients to clarify the presence or absence of arterial hypertension, verify the diagnosis and determine treatment methods. It is recommended to use in firstly detected arterial hypertension, the need to select drug therapy; in existing arterial hypertension and the need for correction of therapy. The frequency of measurements was determined by the methodology of remote medical observation: on average 2 times a day, daily, at rest. Intermediate monitoring of blood pressure indicators is carried out by the nursing personnel. As a reminder of the need to measure blood pressure and take medications, the patient receives feedback via sms-messages, and recommendations on the correction of therapy - by phone call.

The main task of the mobile application is to interact with the sensors of the tonometer or watch. After the blood pressure measurement, the results are conveniently provided to the user and sent to the server. The physician's application is designed to display patient data, results of their measurements with the construction of graphs and statistical diagrams, which allows to analyze the dynamics of the patient's condition for a given sample.

According to the clinical recommendations of the European and Russian Cardiology Societies [21, 62, 76, 77, 95, 96, 99], threshold values of arterial hypertension are established that require one or another reaction (to change the dosage of medications, to invite to an appointment, to call an ambulance, etc.) (Fig. 1).

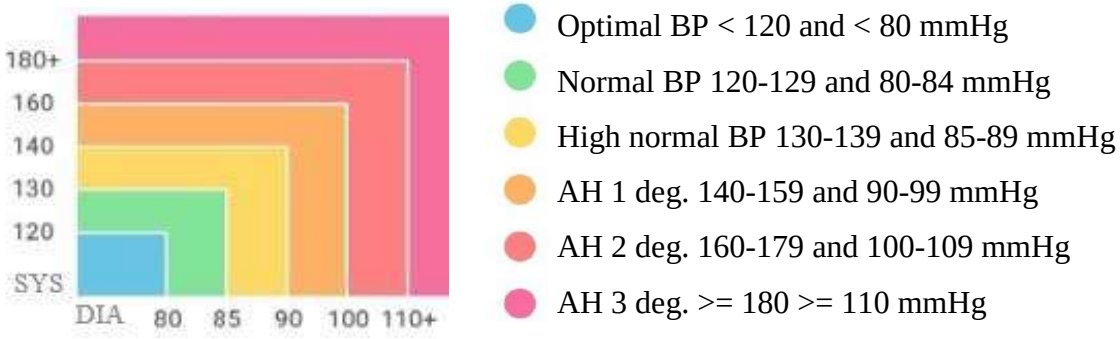

Figure 2.1 – Classification of degrees of arterial hypertension in color

During the observation period (2019 - 2022), all event information was displayed in the personal accounts of attending physicians, who evaluated blood pressure monitoring charts daily, made treatment adjustments if necessary, or called the patient for an appointment. Each patient had more than 6 blood pressure measurements, so we selected materials for the study.

For statistical processing, 6 measurements were taken to best demonstrate the patient's clinical presentation. All the measurements were conditionally divided into periods: the beginning of the study - the first period, the second period (the middle or midpoint of the study) and the third period (the end of the study when target blood pressure values are reached). For each conditional period (beginning and end of the period) 2 measurements were taken for processing.

The sociological study was conducted with respect to participants in the structural and functional technology of the organization of medical care with the use of remote blood pressure monitoring, taking into account the redistribution of functional responsibilities of medical personnel and participatory interaction with patients (211 patients of working age and 107 medical professionals) before and after remote blood pressure monitoring according to specially developed questionnaires. 400 and 200 responses from patients, and 10 medical professionals, respectively, were processed. The patient questionnaire consisted of 20 ascertaining and ranked multiple questions (Appendix A) and the questionnaire of medical professional consisted of 14 ranked multiple questions (Appendices A, B, C, N).

At the end of the third stage of the study, proposals were put forward to improve the provision of medical care using structural and functional technology with the use of remote blood pressure monitoring, taking into account the redistribution of functional responsibilities of medical personnel and participatory interaction with patients.

The division into stages allowed to implement all the tasks set, to scientifically substantiate the medical and social efficiency of the application of remote blood pressure monitoring and to formulate proposals to improve the organization of medical care for cardiological patients in outpatient settings.

2.2 Research bases

The research was conducted in Krasnoselsky and Frunzensky (administrative) districts of St. Petersburg, which is a city of Federal significance located in the North-West of the Russian Federation.

The number of the permanent population of St. Petersburg, according to the Federal Service of the State All-Russian Population Census as of October 1, 2021, amounted to 5 601.9 thousand people, which is 722.3 thousand people more than was recorded in 2010 (4 879.6 thousand people).

Population growth in 2010-2021 was due to migration, the net balance of which exceeded the natural population decline during the intercensal period. St. Petersburg remains the second largest city in Russia, with Moscow topping the list [109].

The intra-city municipalities of St. Petersburg are municipal districts, cities and settlements. As of October 1, 2022, there are 111 municipalities, including 81 municipal districts, 9 cities and 21 settlements.

In 2021, the significant excess of number of women over the number of men, which is characteristic of the Russian population, remained in St. Petersburg, amounting to 550.5 thousand people, compared to 501.8 thousand people in 2010. In 2021, the number of women exceeded the number of men by 21.8%, in 2010 – by 22.9%, in 2002 – by 22.5%. The ratio of men and women has improved somewhat due to a reduction in premature mortality of men (in the period from 2011 to 2019) [34].

The territory of St. Petersburg, in accordance with the Law of St. Petersburg dated 25.07.2005 No.411-68 "On the territorial structure of St. Petersburg", is divided into 18 districts: Admiralty, Vasileostrovsky, Vyborgsky, Kalininsky, Kirovsky, Kolpinsky, Krasnogvardeysky, Krasnoselsky, Kronstadt, Kurortny, Moscow, Nevsky, Petrograd, Petrodvorets, Primorsky, Pushkinsky, Frunzensky, Central districts [18, 176].

The total population of the Frunzensky district of St. Petersburg according to the data of Petrosstat in dynamics for the study period by year showed the following values: in 2014 - from 45 180 to 463 188 in 2019, and Krasnoselsky district - from 369 878 in 2014 to 412 886 thousand people in 2019 [131].

The basis of the present study was 2 typical polyclinics of St. Petersburg providing primary health care to the adult population:

1. SPb GBUZ "City Polyclinic No.91" in Krasnoselsky district.
2. SPb GBUZ "City Polyclinic No.19" in Frunzensky district.

The St. Petersburg State Budgetary Health Care Institution "City Polyclinic No.91 (SPb GBUZ "City Polyclinic" No.91) of Krasnoselsky district has 2 separate units: a polyclinic department for adults and 3 children's polyclinic departments. It provides a wide range of outpatient services to patients of insurance companies, organizations, the population and guests of the city on the basis of a license for more than 50 types of medical activities and in accordance with the territorial program of state guarantees of free medical care to citizens in St. Petersburg. It serves the South-West of the Krasnoselsky district, bounded by Narodnaya Opolcheniya Ave., Peterhof Highway, Avangardnaya St. and Pionerstroy St., in addition, the service area includes Staropanovo settlement, Volodarsky and Lenin settlement. The number of the serviced population is more than 130 thousand people. The polyclinic provides medical services for the prevention, diagnosis and treatment of diseases in outpatient and day hospital conditions, as well as in the "Outpatient surgery center".

City Polyclinic No.91 is located on the basis of six detached buildings with an area of more than 6 thousand m^2. The medical organization employs 1 145 professionals, including 303 physicians, 3 doctors of medical sciences, 4 candidates, 80% of the personnel are specialists of the highest and 1st categories. Employees of St. Petersburg

State Medical Institution "City Polyclinic No.91" constantly improve their qualifications, participate in city, Russian and international conferences and seminars. The organization hosts the clinical base of the Department of Gerontology and Geriatrics of the Northwestern State Medical University named after I.I. Mechnikov, which conducts scientific research on international projects in association with the polyclinic.

St. Petersburg State Budgetary Healthcare Institution "City Polyclinic No.19" serves the attached population (60 499 people), of which 50 830 people are adults and 9 669 children. The MHI program serves residents of the Frunzensky district free of charge and also provides paid medical services.

The structure of the St. Petersburg State Budgetary Health Care Institution "City Polyclinic No.19" (SPb GBUZ "City Polyclinic No.19") has 2 separate units: polyclinic department (for adults and adolescents) and children's polyclinic department No.43.

In the main building of City Polyclinic No.19 there are: 2 therapeutic departments, a specialist department, a day hospital, a rehabilitation department, a preventive department, an infectious and parasitic department, the arterial hypertension prevention cabinet, an emergency department, a geriatric department, a driver's and weapons commission.

The polyclinic is the clinical base of the Department of Health Care Organization of the Kirov Military Medical Academy, where scientific research is conducted, including international projects.

The results of blood pressure measurements were obtained mainly from patients observed in SPb GBUZ "City Polyclinic No.19" and SPb GBUZ "City Polyclinic No.91". Patients from other regions of Russia also joined the study. The Siberian Federal District was represented by patients living in the Irkutsk Region and the Krasnoyarsk Territory, the Urals Federal District by representatives of the Chelyabinsk and Sverdlovsk regions, and the North Caucasus Federal District by patients from the Krasnodar Territory and the Republic of North Ossetia-Alania.

2.3 Statistical methods of processing the obtained data

At the third stage, statistical processing of the obtained data of remote blood pressure monitoring of patients in outpatient settings was carried out.

Statistical analysis of the results with the use of mathematical calculations allowed to achieve the goal and solve the objectives of the study. One of the most significant aspects in conducting statistical analysis (visualization, correlation, factor analysis) of a sample is the substantiation of the chosen techniques and their validity in relation to the general population [85, 92, 92, 93, 148].

Statistical processing of the obtained results was carried out using a personal computer running the Microsoft Windows 7 operating system, Microsoft Excel 2013 software, SPSS 20.0 standard application program package and StatSoft Statistica 10.

For quantitative indicators, descriptive statistics are presented as median, first and third quartiles: Me (Q_1; Q_3) for non-Gaussian distributions and mean, and standard deviation M (SD) for normal distributions. If a quantitative measure was not parametrically distributed in one of the comparison groups, descriptive statistics were reported as Me (Q_1; Q_3) for all groups. The non-parametric Mann-Whitney statistical test was used to determine statistically significant differences between two unrelated groups, for quantitative and ranking indicators. The statistical criterion $\chi 2$ (chi-square) was used to assess the statistical significance of differences in qualitative accounting characteristics.

The studied populations, represented by quantitative data, were evaluated for their compliance with the law of normal distribution, for this purpose the Kolmogorov-Smirnov criterion, recommended for large samples (with the number of subjects more than 50), was used. Since the sample populations include a small number of observations, non-parametric criteria were used to test hypotheses about the presence or absence of differences between the samples, in particular, the Friedman criterion for comparing two or more related samples.

Statistical processing was performed by the non-parametric criterion of agreement, in the classical sense designed to test simple hypotheses about the affiliation of the

analyzed sample to some known distribution law. The most well-known application of this criterion is to test the studied populations for normality of distribution.

Stage I - testing the hypothesis of equality of variances: a two-sample F-test for variances. The purpose of variance matching is to compare the accuracy of BP measurement in patients included in different sample populations. At the same time, the more homogeneous the population in terms of BP measurement results, the less dispersion of measurement results, i.e., the lower the variance.

In the case when the null hypothesis is valid, i.e., general dispersions are the same, then the difference in calculated dispersions is insignificant and is explained by random causes, in particular, by random selection of sample objects.

If the null hypothesis is rejected, i.e., the general variances are not the same, then the difference in calculated variances is significant, which cannot be explained by random reasons. This is a consequence of the difference in the general dispersions themselves:

if $FB < F_{kr}$, there is no reason to reject the null hypothesis H0 about the equality of variances;

if $FB > F_{kr}$, the null hypothesis is rejected and an alternative hypothesis H1 is accepted that the variance difference is statistically significant.

To measure the significance of the criterion under consideration (FB), when rejecting the null hypothesis H_0, a one-sided probability of significance $P(F \leq f)$ is used, which determines the probability that the criterion belongs to the set of the hypothesis acceptance domain, assuming that the null hypothesis H_0 is true. In this case, the sample is consistent with the null hypothesis H_0 when the probability of significance is high and inconsistent when this probability is low. The smaller the value of the one-sided probability of significance $P(F \leq f)$, the stronger this fact plays against the hypothesis H_0. Using the probability of significance, we measure the so-called degree of distrust of the underlying hypothesis H_0. The probability of significance close to zero is interpreted as the degree of distrust being close to the unit, i.e., as a very strong argument against the hypothesis H_0. A probability of significance close to unit indicates that the degree of distrust is close to zero, i.e., the arguments against H_0 are weak, which actually indicates that the sample agrees with the H_0 hypothesis.

Stage II - testing the hypothesis of significance of differences in independent samples using a two-sample t-test with equal variance and with different variances.

The most important indicators are the actual (t-statistics) and tabular (critical) values of the Student's criterion. If the actual value of the Student's criterion (t-statistics) is greater than the tabular one (t-critical two-sided with the number of degrees of freedom - df), H_0 is rejected.

Stage III - testing the the hypothesis of significance of the differences in related samples using a paired two-sample t-test for averages. It is used to test the hypothesis of equality of averages at the significance level a. In our case, the hypothesis H 0 is tested that the differences between the average values of blood pressure in different periods are random, they are statistically insignificant. Equality of variances is not required. If |t-statistics| < t-critical two-sided ($t_{0.95}$), the hypothesis H_0 is accepted, i.e., the average values of the compared samples do not differ statistically significantly and belong to the same general population. If |t-statistics| > t-critical two-sided ($t_{0.95}$), the null hypothesis is rejected and the alternative hypothesis H_1 is accepted that the differences between the compared average values of blood pressure in the samples are statistically significant, exist, are not random.

Stage IV - testing the the hypothesis of significance of differences in related total samples (men + women) using a paired two-sample t-test for averages.

At the end of the third stage, the medical and social efficiency of the study was analyzed and proposals were developed for the organization of medical care with the use of remote blood pressure monitoring, considering the redistribution of functional responsibilities on the basis of participatory interaction of medical professionals with patients within the framework of a high-risk strategy (Appendices C-N).

CHAPTER 3 MEDICAL AND SOCIAL APPROACHES TO CARDIOVASCULAR DISEASE PREVENTION

Analysis of the dynamics and trends of the main indicators of public health, socially significant diseases, including hypertension and the study of risk factors for their development, organization of identification of high-risk groups and early forms of cardiovascular diseases, preventive and curative measures for the timely provision of specialized medical care, are among the most important medical and social approaches to creating the basis for solving the most important medical and social issues [170, 171, 172, 173].

3.1 Analysis of the prevalence of cardiovascular disease risk factors in patients of working age

To solve one of the tasks of the scientific research, in order to improve the organization of medical care for patients with arterial hypertension using remote blood pressure monitoring, the activity of the arterial hypertension prevention cabinet was analyzed, the primary task of which is the early detection of arterial hypertension and CVD risk factors.

During the study period (from 2014 to 2018), 983 referrals of patients of working age from 18 to 65 years with risk factors for cardiovascular disease were recorded in the arterial hypertension prevention cabinet. According to the selection criteria, 807 cases of patient referrals were included in the processing, of which men referred 382 times and women 426 times, accounting for 47.4% and 52.5%, respectively. The average age of the applicants was 42.9±1.8 years (Fig.3.1).

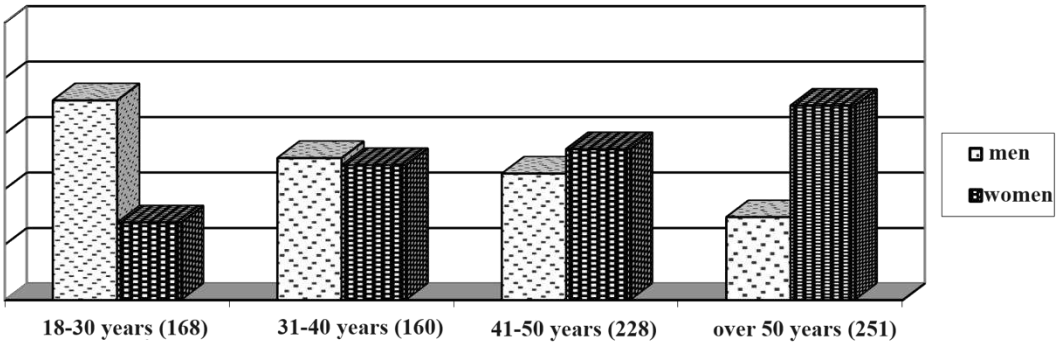

Figure 3.1 - Age and gender characteristics of patients of working age who applied to the arterial hypertension prevention cabinet for five years (from 2014 to 2018)

There were 2 times more referrals from men aged 18-30 than from men over 50. On the contrary, women of the age 50 years old and older referred 3 times more than those of 18-30 years.

In general, the number of visits to the arterial hypertension prevention cabinet in the period from 2014 to 2018 decreased. The largest number of referrals of patients with risk factors for the development of cardiovascular diseases was noted in 2014 - 293 (36.3%), and the smallest number of referrals in 2018 – 97 (12.0%). In 2015, 133 cases (16.5%) were registered, in 2016 - 134 (16.6%), in 2017 - 150 (18.6%) of the total number of referrals (Table 3.1).

Against the background of a decrease in the number of referrals to the arterial hypertension prevention cabinet, a wave-like increase in the number of detected cases per year of all significant risk factors for the development of cardiovascular diseases except hypercholesterolemia was noted in the above period by 2018.

The analysis of medical records and observation from 2014 to 2018 showed that the most common risk factors for cardiovascular disease were hypercholesterolemia - identified in 56.9% of patients (from 83.0% in 2014 to 67.0% in 2018); obesity - in 38.9% of patients (from 41.3% in 2014 to 55.7% in 2018); and overweight - in 36.6% of patients (from 35.2% in 2014 to 55.7% in 2018) among those who referred.

Annual detection of risk factors such as, tobacco smoking by 4.6% (from 18.1% in 2014 to 22.7% in 2018); arterial hypertension by 15.6% (from 13.3% in 2014 to 28.9%

in 2018), alcohol use by 16.5% (0.7% in 2014 to 17.5% in 2018), low physical activity by 31% (from 1% in 2014 to 32% in 2018) (Table 3.1).

The number of detected cases of hereditary predisposition (non-modifiable factor) was 20.2% more in 2018 than in 2014 (from 35.5% to 55.7%, respectively). Obesity and overweight were reported in 76% of the observed.

The prevalence of risk factors for the development of cardiovascular diseases was different among men and women, but significant differences were found in two indicators - hypercholesterolemia and tobacco smoking. Hypercholesterolemia was more common among women than men (65.0% and 54.5%, respectively) ($p<0.002$). At the same time, hypercholesterolemia was significantly more common in women aged 18 to 40 years than in older women (41 years and older) (Table.3.2).

Tobacco smoking, on the contrary, was 4 times more common among men (90 out of 382 (23.6%) than among women (35 out of 425 (8.2%)) ($p<0.001$). At the same time, tobacco was smoked more often by men over 40 years old.

Having studied the prevalence of risk factors and identified changes in the functional state of the cardiovascular system of patients of different ages who referred to the arterial hypertension prevention cabinet, it was noted that patients under 30 and 31-40 years were more likely to have excessive body weight, hypertension stage I, hypercholesterolemia, arterial hypertension; patients of 41-50 years and older had hypercholesterolemia, obesity, hypertension stage I and II (Table 3.3).

Table 3.1 - Frequency of cardiovascular disease risk factors in patients of working age who referred to the arterial hypertension prevention cabinet (from 2014 to 2018), %

Risk factor	Number of referred per year										Total revealed for the entire period from 2014-2018 (n= 807)	
	2014 (n= 293)		2015 (n= 133)		2016 (n= 134)		2017 (n= 150)		2018 (n= 97)			
	Abs.	%	Abs.	%	Abs.	%	Abs.	%	Abs.	%	Abs.	%
Hypercholesterolemia	243	83.0	57	42.9	50	37.3	44	29.3	65	67.0	459	56.9 average
Obesity	121	41.3	53	39.8	39	29.1	51	34.0	54	55.7	318	39.4 average
Excess body weight	103	35.2	41	30.8	47	35.1	50	33.3	54	55.7	295	36.6 average
Hereditary factor	104	35.5	6	4.5	16	11.9	46	31.7	54	55.7	226	28.0 average
Tobacco smoking	53	18.1	8	6.0	6	4.5	9	6.0	22	22.7	98	12.1 average
Arterial hypertension	39	13.3	17	12.8	9	6.7	10	6.7	28	28.9	103	12.8 average
Alcohol consumption	2	0.7	0	0.00	0	0.00	0	0.00	17	17.5	19	18.2 average
Low physical activity	3	1.0	0	0.00	0	0.00	0	0.00	31	32.0	34	33.0 average

where n is the number of referrals in a given year

Table 3.2 - Prevalence of risk factors for cardiovascular diseases among men and women of working age who referred to the arterial hypertension prevention cabinet (from 2014 to 2018)

Risk factors	Gender		p-value	Gender	
	M (n=382)			W (n=425)	
	Abs.	%		Abs.	%
Hypercholesterolemia	208	54.5	**0.002**	277	65.0
Hypertensive disease (HD) II	179	46.9	0.93	179	46.9
Hypertensive disease (HD) I	148	38.7	0.82	148	38.7
Obesity	144	37.7	0.06	170	39.9
Excess body weight	152	39.8	0.38	142	33.3
Tobacco smoking	90	23.6	**0.001**	35	8.2
Hereditary factor	87	22.8	0.88	99	23.2
Arterial hypertension as RF	43	11.3	0.15	43	11.3
Alcohol consumption	14	3.7	0.26	22	4.9
Complications (AMI and ACVA)	12	3.1	0.15	23	5.2
Physical inactivity (hypodynamia)	12	3.1	0.26	20	4.7

, where n is the number of men and women in the study group

Table 3.3 - Prevalence of risk factors and detected changes in the functional state of the cardiovascular system, among patients of working age who referred to the arterial hypertension prevention cabinet, depending on age (from 2014 to 2018), %

Indicator	**Age**				p-value	p-value	p-value	p-value	p-value	p-value
	up to 30 years old (n=168)	31-40 years old (n=160)	41-50 years old (n=228)	50 years and older (n=281)	up to 30 - 31-40	up to 30 - 41-50	up to 30 – 50 years and older	31-40 - 41-50	31-40 – 50 years and older	41-50 – 50 years and older
Excess body weight	38.3	38.3	9.8	35.2	0.94	0.68	0.22	0.65	0.23	0.40
Hypertensive disease (HD) I	51.1	51.1	40.3	23.3	***0.002***	***<0.001***	***<0.001***	0.06	0.06	0.88
Hypertensive disease (HD) II	25.5	25.5	43.5	1.9	***<0.001***	***<0.001***	***<0.001***	0.023	0.037	0.99
Arterial hypertension	44.7	44.7	14.5	0.6	***0.007***	***<0.001***	***<0.001***	0.46	0.11	0.32
Alcohol	14.9	14.9	4.8	0.0	0.35	0.37	0.80	0.11	0.27	0.59
Hypercholesterolemia	36.2	36.2	62.1	79.0	***0.001***	***<0.001***	***<0.001***	***0.009***	***0.007***	0.75
Hereditary predisposition	23.4	23.4	24.2	19.9	0.33	0.81	0.27	0.47	0.88	0.39
Tobacco smoking	17.0	17.0	8.9	0.6	0.017	0.59	0.049	0.07	0.75	0.16
Low physical activity	14.9	14.9	4.0	0.0	0.35	0.57	0.80	0.17	0.51	0.47
Obesity	34.0	34.0	41.1	43.2	***<0.001***	***<0.001***	***<0.001***	0.20	0.41	0.70
(AMI and ACVA)	14.9	14.9	4.8	0.6	0.35	0.57	0.80	0.17	0.51	0.47

, where n is the number of patients of the specified age.

Statistically significant differences were noted between young and older patients in terms of risk factors for the development and changes in the functional state of cardiovascular diseases such as hypertension, hypercholesterolemia, arterial hypertension, obesity.

Among young patients, hypercholesterolemia, overweight and obesity, arterial hypertension, HD I were more common.

And among the patients of mature age – hypercholesterolemia, obesity and HD I.

Patients with diagnosed hypertension, including after acute myocardial infarction (AMI) and acute cerebrovascular accident (ACVA), or brain stroke, were referred to the arterial hypertension prevention cabinet.

These diseases are known as both independent and risk factors for the development of cardiovascular disease, which is a complication of hypertension.

In our study, we considered aggravation of one of the cardiovascular risk factors in HD I or II as a complication (deterioration of the functional state of the cardiovascular system), as well as a complication from hypertension (AMI and FCVA) (Table 3.4).

Table 3.4 - Frequency of hypertension and complications from cardiovascular diseases in patients of working age who referred (from 2014 to 2018) to the arterial hypertension prevention cabinet, (%).

Complications of cardiovascular diseases		2014 (n=293)		2015 (n=133)		2016 (n=134)		2017 (n=150)		2018 (n=97)		*Total*	
		Abs.	%	Abs.	%	Abs.	%	Abs.	%	Abs.	%	Abs.	%
Hypertensive disease (HD) I	[present]	49	17.7	50	37.6	51	38.0	80	53.3	68	70.1	298	37.0
	[absent]	244	83.3	83	62.4	83	62.0	70	46.7	29	29.9	509	63.0
Total		***293***	***100.0***	***133***	***100.0***	***134***	***100.0***	***150***	***100.0***	***97***	***100.0***	***807***	***100.0***
Hypertensive disease (HD) II	[present]	147	50.2	67	50.4	65	49.5	51	34.0	51	52.6	381	47.2
	[absent]	146	49.8	66	49.6	69	51.5	99	66.0	46	47.4	426	52.8
Total		***293***	***100.0***	***133***	***100.0***	***134***	***100.0***	***150***	***100.0***	***97***	***100.0***	***807***	***100.0***
AMI and ACVA	[present]	3	1.0	0.00	0.00	0	0.00	0	0.00	31	32.0	34	4.2
	[absent]	290	99.0	133	100	134	100	150	100	66	68.0	773	95.8
Total		***293***	***100.0***	***133***	***100.0***	***134***	***100.0***	***150***	***100.0***	***97***	***100.0***	***807***	***100.0***

where n is the number of referrals in a given year

In total, during the entire observation period, HD I was noted in 37%, while its occurrence in 2018 was noted 4 times more than in 2014 (17.7% and 70.1%, respectively).

Almost half of the patients were found to have HD II - 47.2%, and complications from cardiovascular diseases (acute myocardial infarction and acute cerebral circulation disorder) in 4.2% of the observed patients.

HD I and II is a disease, and arterial hypertension as a risk factor for the development of cardiovascular diseases, which in turn lead to complications from CVD (acute myocardial infarction, acute cerebral circulatory insufficiency) (Table 3.5).

One of the approaches to reducing the prevalence of socially significant diseases is the prevention of risk factors.

The causes of complications are most often modified cardiovascular risk factors.

Table 3.5 - Occurrence of hypertension and complications from cardiovascular disease among working age patients (from 2014 to 2018), %

Indicator:	1 gr. G_{inef}, (n= 485)		2 gr. G_{ef}, (n = 322)		p
	Present	Absent	Present	Absent	
Hypertensive disease (HD) I	51.8	48.2	15.7	84.3	**$2{,}4 \cdot 10^{-6}$**
Complications (AMI or ACVA)	6.4	93.6	0.9	99.1	**0.0002**
Hypertensive disease (HD) II	48.6	51.4	45.9	54.1	0.45

, where n is the number of detected cases of changes in the functional state of the cardiovascular system

The spread of socially significant diseases, including CVD, is closely related to lifestyle, and, in particular, to behavioral risk factors. Tobacco smoking, insufficient consumption of fruits and vegetables, excessive alcohol consumption and low physical activity are the main causes of premature death in the Russian population.

In the course of the study, we were able to determine that in some cases behavioral factors were the cause of aggravation of functional status and complications of CVD (acute myocardial infarction, acute cerebral circulatory failure).

Such cases of deterioration of the functional state of the cardiovascular system over five years (from 2014 to 2018) were detected in 485 (60%) of the observed. We combined these cases into the first group, which we called ineffective (1 gr. – G_{inef}, n = 485) (Table.3.6).

We called the other group effective (2 gr. - G_{ef}, n = 322) – 40% of all observations. It should be noted that in both groups the number of men and women was about the same – about 50%. The average age of patients in group 1 (G_{inef}, n = 481) was 42 years, and in group 2 (G_{ef}, n = 322) – 47 years.

It should be noted that the number of patients from the first group of G_{inef} n = (485) was not only greater than in the second group of G_{ef} (n = 322) (60 and 40%, respectively), but also the average age in the first group was 5 years less (42 years and 47 years, respectively).

The rating of risk factors that caused the deterioration of the functional state of the cardiovascular system among the patients who identified these groups turned out to be different.

Thus, the most frequent causes of aggravation of the state of the cardiovascular system in patients of the first group (G_{inef}, n = 481) of the modifiable were (descending): obesity, overweight, tobacco smoking, hypertension (as a risk factor), and of the non-modifiable - hypercholesterolemia. In 60% of cases, they led to deterioration of the functional state of the cardiovascular system, namely, HD I and complications (acute myocardial infarction and acute cerebrovascular accident) (Table 3.7).

Table 3.6 – Prevalence of risk factors for the development of the cardiovascular system among patients of working age (%)

Risk factors	**1 gr. G inef, (n= 485)**		**2 gr. G ef, (n = 322)**		**p**
	Present	**Absent**	**Present**	**Absent**	
Hypercholesterolemia	44.1	55.9	85.8	14.2	**$2.6 \cdot 10^{-32}$**
Obesity	37.8	62.2	41.5	58.5	0.30
Excess body weight	38.5	61.5	34.3	65.7	0.23
Hereditary factor	16.8	83.2	33.0	67.0	**$1.2 \cdot 10^{-7}$**
Tobacco smoking	14.1	85.9	17.9	82.1	0.15
Arterial hypertension as a risk factor	13.7	86.3	12.3	87.7	0.55
Alcohol consumption	6.7	93.3	0.9	99.1	**0.0001**
Physical inactivity (hypodynamia)	6.7	93.3	0.0	100.0	**$2.7 \cdot 10^{-6}$**

, where n is the number of detected cases of changes in the functional state of the cardiovascular system

Table 3.7 – Prevalence of risk factors for the development of the cardiovascular system among patients of working age by gender (%)

Risk factors for HD development	**1 group G inef (n= 485)**				**2 group G ef (n = 322)**				**p-values of men**	**p-values of women**
	M n=230(47.8%)		**W n=251(52.2%)**		**M n=148(46.5%)**		**W n=170(53.5%)**			
	no	**yes**	**yes**	**no**	**no**	**yes**	**yes**	**no**		
Hypercholesterolemia	36.1	63.9	51.4	48.6	84.5	15.5	87.1	12.9	**0.001**	**0.001**
Hypertonic disease	37.1	62.9	61.4	38.6	14.4	85.6	46.5	53.5	**0.001**	**0.001**
Obesity	34.8	65.2	40.6	59.4	43.2	56.8	40.0	60.0	0.90	**0.002**
Excess body weight	41.3	58.7	35.9	64.1	38.5	61.5	30.6	69.4	**0.002**	**0.26**
Hereditary factor	17.4	82.6	16.3	83.7	31.8	68.2	34.1	65.9	**0.001**	**0.001**
Tobacco smoking	17.8	82.2	10.8	89.2	33.1	66.9	4.7	95.3	**0.001**	**0.027**
Alcohol	5.2	94.8	8.0	92.0	1.4	98.6	0.6	99.4	**0.001**	**0.001**
Complications (AMI or ACVA)	4.8	95.2	8.0	92.0	0.7	99.3	0.9	98.8	**0.001**	**0.26**
Low physical activity	5.2	94.8	8.0	92.0	0.0	100.0	0.0	100.0	**0.001**	**0.001**

, where n is the number of detected cases of changes in the functional state of the cardiovascular system.

The presence of one or another risk factor in patients has the value "present" if at least one of the examinations within five years revealed the corresponding stage of the disease or a risk factor for its development.

As a result of the analysis of the prevalence of risk factors for the development of the cardiovascular system among patients of working age by gender, it was revealed that the most common and statistically significant were hypercholesterolemia, obesity, low physical activity, complications associated with AMI or ACVA are most common in both men and women in the effective - G_{ef} group. And in the ineffective G_{inef} group - HD I, tobacco smoking in men, and overweight and low physical activity in women.

All of the above highlights the importance of preventive measures to reduce cardiovascular risk. SCORE analysis is a typical procedure for examining the functional state of patients with risk factors for the development of the cardiovascular system.

As part of the retrospective study, the observed patients were analyzed to calculate the SCORE 10-year risk estimate for cardiovascular mortality (Table 3.8).

Table 3.8 - Estimated 10-year risk of death from cardiovascular disease in working age men and women who referred to the arterial hypertension prevention cabinet, according to the SCORE scale (from 2014 to 2018), %

Gender	**Age, years**	**Identified cases of high risk of cardiovascular complications by year, %**					**On average for the entire period, %**
		2014	**2015**	**2016**	**2017**	**2018**	
Female	18–30	9.7	12.0	14.5	13.4	15.6	13.2
	31–40	5.1	9.0	9.0	13.3	12.8	10.0
	41–50	7.3	9.4	14.8	14.5	13.0	12.1
	50 and older	23.0	10.1	14.8	6	11.6	13.3
Male	18–30	13.7	11.2	11.4	15.6	13.5	13.2
	31–40	11.5	13.1	12.0	13.0	11.9	12.5
	41–50	14.7	17.2	13.0	15.2	11.6	13.0
	50 and older	15.0	18.0	10.5	9.0	10.0	12.7

As a result of the analysis, it was found that in older patients, regardless of gender, the risk rate for developing 10-year mortality, decreased in a wave-like manner (W - 11.6% and M - 5%).

The frequency of occurrence of high relative (18-40 years) and absolute (41-50 years) cardiovascular risk among referred women increased by 6.5% in 2018 compared to 2014. A different trend was observed among young men 18-30 years old - the variability of the index of relatively high cardiovascular risk by 2018 decreased in a wave-like manner by 0.2% and 0.4%, respectively.

The increase in high relative cardiovascular risk changed slightly in men aged 18-30 and 31-40 years by 0.2 and 0.4%, respectively.

Thus, the analysis of the primary medical documentation of the arterial hypertension prevention cabinet, conducted at the first stage of the study (2014-2018) and the observation of patients who referred to the cabinet, allowed us to identify the most common modified risk factors for the development of hypertension. Obesity with overweight, smoking and low physical activity triggered the mechanism of hereditary predisposition and, together with it, activated biological risk factors (hypercholesterolemia, high blood pressure), which in turn led to deterioration of the functional state of the cardiovascular system in 60% of patients (hypertension, heart attacks and strokes).

When processing data on the dynamics of complications of the development of the cardiovascular system on the SCORE scale (from 2014 to 2018), it was found that the relative cardiovascular risk is highest in women aged 18 to 40 years than in men of the same age.

Insufficient awareness of the population about the risk factors for the development of socially significant diseases is one of the main causes of high incidence and mortality. To increase the efficiency of preventive measures, it is necessary to actively inform the population in order to correct them in a timely manner. Therefore, it is difficult to overestimate the importance of timely information about CVD risk factors, since the prevalence of socially significant diseases depends on it.

3.2 Analysis of patients' awareness of risk factors for the development of cardiovascular diseases

Awareness of risk factors has a significant impact on the prevalence of socially significant diseases. It increases the awareness of patients about their health, allows them to take measures to prevent the disease, and also activates preventive measures [179, 180, 181, 183, 185, 186].

To achieve the goal of the second stage of the study (2018-2019), a medical and social study of patients of working age was conducted using a specially developed questionnaire consisting of 20 questions (Appendix A).

200 patients of working age who referred to the arterial hypertension prevention cabinet were interviewed, including 82 (41%) men and 118 (59%) women, whose average age was 42.1 and 41.8 years, respectively (Fig. 3.2).

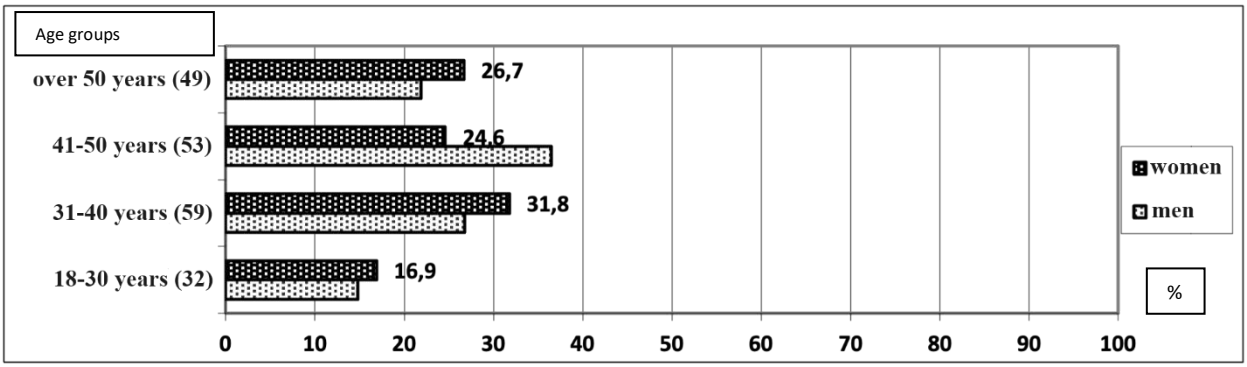

Figure 3.2 – Characteristics of patients of working age who have referred for medical care in a city polyclinic (2018-2019), distribution by gender and age

1.5 times more women than men took part in the survey. The largest number of respondents were 41-50 years of age – 61.1%, and the age group of 18-30 years, on the contrary, was the smallest – 31.7%, both among men and women.

Women aged 31-40 years (31.8%) visit medical organizations more often than those aged 18-30 years (16.9%). Men aged 31-40 years (26.8%) also visit the polyclinic more often than those aged 18-30 years (16.9%).

Men of 41-50 years (36.5% of the respondents) and women of 31-40 years (31.8% of the respondents) are the most active in relation to their own health. As a result of data processing, the social characteristics of respondents were studied (Table 3.9).

Of the middle-aged respondents (31-50 years old), 62% had a higher education. Respondents of young (18-30 years old) and older age (51 years and older), 50% and 75% respectively, had secondary vocational education, both men and women. Among men, 83.8% are working, and 11% are wives. The majority of respondents are employed 83.8%. More than 60% of respondents were married.

When studying questions about patients' awareness of their own health status (knowledge of optimal blood pressure, health group and body mass index), preventive measures (registration, health centers and AH schools) and the use of devices for remote transmission of blood pressure data from the patient to the physician in order to prevent cardiovascular risk factors, it was found that patients, on average, are quite well informed about their own health. There is less awareness of the organization of cardiovascular disease prevention using remote blood pressure data transmission devices (Table 3.10).

Table 3.9 – Social characteristics of respondents of working age who referred for medical care (2018-2019), distribution by gender and age (%)

Indicator	**gender**	**Age**									
		18 - 30 (n=32)		**31 – 40 (n=59)**		**41 – 50 (n=53)**		**51 and older (n=49)**		**Total (n=200)**	
		Abs.	**%**	**Abs.**	**%**	**Abs.**	**%**	**Abs.**	**%**	**Abs.**	**%**
Full secondary education	M	3	25.0	1	4.5	3	12.5	2	11.1	9	11.0
	W	3	15.0	3	8.3	2	7.1	3	9.7	11	9.3
Secondary special education	M	6	50.0	14	31.8	13	33.3	14	77.8	36	44.4
	W	10	50.0	25	22.2	15	39.3	23	74.2	54	45.3
Higher education	M	3	25.0	7	63.6	8	54.2	2	11.1	36	44.4
	W	7	35.0	8	69.4	11	60.7	5	16.1	54	45.3
Employed	M	14	70.0	32	86.5	24	92.3	27	90.0	99	83.8
	W	3	25.0	1	4.5	3	12.5	2	11.1	9	11.2
Married	M	4	33.3	16	72.7	18	72.0	13	76.5	51	62.2
	W	9	24.3	23	62.2	17	60.7	22	75.9	71	60.2

, where n is the number of respondents in the group

Table 3.10 – Results of respondents' awareness of health indicators, preventive measures by gender and age (%)

Awareness	**gender**	**Age**									
		18 - 30 (n=32)		**31 – 40 (n=59)**		**41 – 50 (n=53)**		**51 and older (n=49)**		**Total (n=200)**	
		Abs.	%	Abs.	%	Abs.	%	Abs.	%	Abs.	%
"Optimal" BP figures	M	9	75.0	14	63.6	17	68.0	13	72.2	54	65.9
	W	13	65.0	27	75.0	20	71.4	25	80.6	85	72.6
Health group	M	0	0	5	9.5	4	16.0	2	11.8	11	13.6
	W	13	65.0	20	55.6	11	39.3	8	26.7	52	45.2
Body mass index	M	3	25.0	12	54.5	10	41.7	6	35.3	33	41.2
	W	14	73.7	18	50.0	10	35.7	17	54.8	59	51.3
Registration at the dispensary	M	3	25.0	2	9.5	7	29.2	6	35.3	18	22.8
	W	10	50.0	9	25.0	7	25.9	12	38.7	38	33.0
About Health centers and "Health Schools"	M	1	8.3	4	22.2	5	20.0	2	11.8	12	15.6
	W	7	35.0	5	13.5	7	25.0	7	23.3	26	22.6
On the use of devices with remote transmission of BP data from patient to physician	M	9	75.0	16	72.7	15	60.0	10	58.8	52	65.0
	W	10	50.0	12	33.3	17	60.7	7	23.3	52	45.2

, where n is the number of respondents in the group by gender

A high level of awareness about their own health was noted among respondents of average (31-50 years old) and older age. Women were the most informed on these issues. In general, women knew more about optimal blood pressure figures than men (W – 72.6% and M – 65.9%), about the health group (W – 45.2% and M -13.6%) and body mass index (W – 51.3% and M – 41.2%).

A high level of knowledge about preventive measures (medical observation, health centers) was noted among respondents of middle (31-50 years old) and older age, in contrast to 18–30-year-olds.

The highest level of awareness about the use of devices with remote transmission of blood pressure data from the patient to the physician was demonstrated by young respondents (18-30 years old). And least of all, as expected, such information was possessed by older respondents. The level of knowledge about the use of such devices was different among men and women - 65% and 45.2%, respectively.

Of highest concern is the fact that from 10 to 15% of respondents did not have any information at all about the general risk factors for the development of the disease. Low awareness of patients increases the risk of adverse outcomes of the course of the disease and its complications. In such patients, behavioral risk factors (smoking, alcohol consumption, low physical activity, eating disorders) are more often recorded, lead to deterioration of the functional state of the cardiovascular system, the development of hypertension and complications (acute myocardial infarction, acute cerebral circulatory insufficiency).

Further analysis of the data obtained showed the most significant risk factors for the development of cardiovascular diseases for the respondents (Table 3.11).

Table 3.11 - Respondents' opinion on the most significant modifiable risk factors for cardiovascular disease development by gender and age (%)

Awareness of such risk factors for the development of CVD as	**gender**	**Age**									
		18 - 30 (n=32)		**31 – 40 (n=59)**		**41 – 50 (n=53)**		**51 and older (n=49)**		**Total (n=200)**	
		Abs.	%	Abs.	%	Abs.	%	Abs.	%	Abs.	%
Consumption of alcoholic and energy drinks	M	9	75.0	19	86.4	24	96.0	16	88.9	68	88.3
	W	17	85.0	37	100.0	26	92.9	28	90.3	107	93.0
About overweight and obesity	M	9	75.0	20	90.9	24	96.0	14	77.8	67	87.0
	W	19	95.0	34	94.4	25	89.3	29	93.5	107	93.0
About hereditary predisposition	M	9	75.0	19	86.4	23	92.0	14	77.8	65	84.4
	W	18	90.0	34	94.4	26	92.9	29	93.5	107	93.0
Tobacco smoking	M	10	83.3	22	100.0	24	96.0	14	77.8	70	90.1
	W	18	90.0	37	100.0	24	85.7	28	90.3	106	92.2
Psychoemotional burn-out	M	9	75.0	21	95.5	24	96.0	14	77.8	68	88.3
	W	17	85.0	35	97.2	24	85.7	25	80.6	101	87.8
Physical burn-out	M	9	75.0	21	95.5	23	92.0	16	88.9	69	89.6
	W	18	90.0	32	88.9	23	82.1	23	74.2	96	83.5
Monotony of work and lack of physical activity	M	9	75.0	21	95.5	20	80.0	14	77.8	64	83.1
	W	16	80.0	35	97.2	24	85.7	21	67.7	96	83.5

, where n is the number of respondents in the group by gender and age

*Significance for patients of a particular risk factor, a value "present" in Table 3.11

Young survey participants (18-40 years old) considered tobacco smoking, non-compliance with the work and rest regime, excessive body weight as the most significant risk factors, and alcohol consumption, hereditary predisposition, physical burn-out and monotony of work as the least significant ones.

For respondents of average (31-50 years old) and 41-50 years old, tobacco smoking, alcohol consumption, non-compliance with the work and rest regime were the most significant, and the least significant were monotony of work, hereditary predisposition, physical burn-out.

Older respondents (50 years and older) noted that excessive alcohol consumption, overweight and hereditary predisposition are the most significant, and the least significant are monotony of work, physical and psycho-emotional burn-out.

As a result of comparative analysis of respondents' opinions by gender, it was noted that women considered the most significant modifiable risk factors for cardiovascular disease development: excessive body weight, consumption of alcoholic and energy drinks, tobacco smoking and non-observance of work and rest regime. Women considered monotony of work, lack of physical activity and psychoemotional burn-out to be less significant factors.

Tobacco smoking, physical and psychoemotional burn-out were more significant risk factors for men, while alcohol and energy drinks, hereditary predisposition, and overweight were less important.

Observations were expressed in insufficient control over the health status of patients in health groups II and IIIa, which affected the quality of medical care provided.

The study of risk factors for the development of diseases in patients allows us to identify approaches and prevention strategies that can help in preventing the development of diseases or slowing their progression.

Thus, at this stage of the study, as a result of a retrospective analysis of primary medical documentation and patient observation, shortcomings in the organization of regular medical dynamic observation were revealed. They were expressed in insufficient control over health status of patients of health groups II and IIIa and deterioration of

functional state in 60% of observed patients (acute myocardial infarction, acute cerebral circulatory insufficiency).

We found that the causes of complications are most often modified risk factors for cardiovascular diseases - obesity, excessive body weight, tobacco smoking, arterial hypertension (as a risk factor), and of the non-modifiable ones - hypercholesterolemia.

When studying questions about patients' awareness of their own health, preventive measures and the use of devices for remote blood pressure data transmission from the patient to the physician, it was found that patients on average are quite well aware of their own health. But at the same time, they are poorly motivated to prevent their risk factors for disease development, poorly informed about the procedure for organizing regular medical monitoring of cardiac patients. They know even worse about remote blood pressure monitoring. And from 10 to 15% of respondents on the above questions did not have any information.

Such patients with deterioration of functional status in the presence of identified, modifiable risk factors for cardiovascular diseases, against the background of insufficient awareness and with reduced motivation, as well as women of 18-40 years old with hypercholesterolemia fell into the circle of our scientific interests and were selected for the study.

Summing up the above, the shortcomings identified in the course of the study allowed us to assert that for more effective regular medical dynamic monitoring of such patients it is necessary to use a structural and functional technology of medical care organization with the use of remote blood pressure monitoring on the basis of participatory interaction and taking into account the redistribution of functional responsibilities of medical professionals.

CHAPTER 4 EVALUATION OF THE EFFICIENCY OF STRUCTURAL AND FUNCTIONAL TECHNOLOGY OF MEDICAL CARE ORGANIZATION WITH THE USE OF REMOTE BLOOD PRESSURE MONITORING

The introduction of telemedicine technologies into the healthcare system is one of the key areas of development of modern medicine. This process requires appropriate organizational changes, primarily related to optimal software and equipment, as well as the redistribution of functional responsibilities of medical professionals.

4.1 Scheme of structural and functional technology of medical care organization with the use of remote blood pressure monitoring

Telemedicine technologies in the healthcare system are an integral part of modern medicine. An integrated approach that combines advanced technologies and effective management of medical personnel makes it possible to ensure accessibility to medical care and its efficiency.

The developed structural and functional technology of the organization of medical care is based on the participatory interaction of each participant (patient, medical and non-medical personnel). It is worth noting that we consider "participativity" as a patient's conscious and active role in making decisions about their health (Figure 4.1).

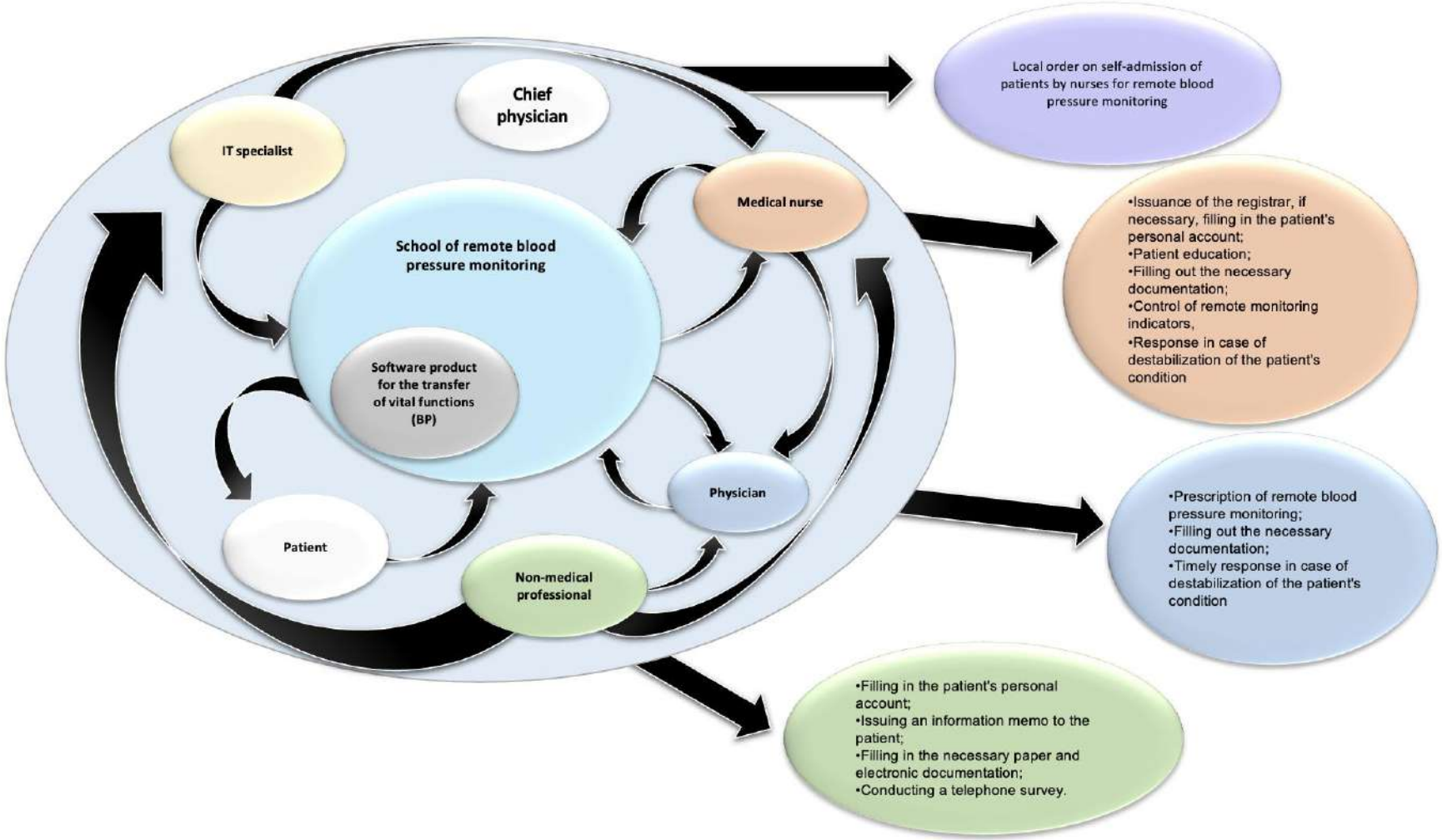

Figure 4.1 – Diagram of the structural and functional technology for the organization of medical care with the use of remote blood pressure monitoring, taking into account the redistribution of functional responsibilities of medical personnel and participatory interaction with patients in outpatient settings

The developed technology is provided by the presence of organizational and functional elements, the central of which is a patient with high blood pressure, who is assigned remote blood pressure monitoring by means of a software product within the framework of the online "Schools of remote blood pressure monitoring".

The work of the new structural and functional technology is ensured by the interaction of a team consisting of a physician, a nurse and medical assistants who have been instructed in the use of the device. The distribution of functionality and work schedule is regulated by the local order of the chief physician. These organizational solutions will be able to ensure accessibility and improve the quality of medical care.

Optimization of the physicians' work schedule will allow to evenly distribute the load and meet the needs of patients in different time periods. An analysis of the patient admission process will help determine the time periods with the highest workload in which additional physcians are required. When using this data, additional resources can be provided. For example, standard guidelines have been developed to improve the process of making an appointment with a physician and standardize the processes of drawing up, updating and maintaining schedules in medical organizations.

The effective use of information technology is also important. For example, a digital patient management system can help physicians to optimize working hours. An online appointment system will simplify the planning and organization of patient appointments, as well as reduce waiting times. Convenient access to electronic medical records will reduce the time spent on data preparation and processing. It is also necessary to rationally use technologies and information systems to reduce the time spent on routine tasks and improve the efficiency of physicians.

Moreover, delegating some medical personnel to other members of the medical staff can help free up physicians' time for more complex cases. Personnel with paramedical training can assist in compiling lists for check-ups and preventive examinations. Non-medical personnel can be assigned to patient record keeping and other tasks, including obtaining lab results and entering information into medical records. Specially trained medical assistants can also help physicians with administrative tasks.

Considering the above, the proposed structural and functional technology for the organization of medical care with the use of remote blood pressure monitoring performs a regulatory role in the prevention of cardiovascular diseases and patients' adherence to therapy. The technology is based on making organizational decisions on the redistribution of functional responsibilities of medical professionals and the participatory interaction of all participants in the therapeutic and preventive process. The use of this technology increases the availability of medical care and makes it possible to evaluate not only remote blood pressure monitoring as a separate medical service, but also the quality of medical care provided in outpatient settings.

4.2 Organization of remote blood pressure monitoring in patients of working age in outpatient settings as a key element of structural and functional technology of medical care organization

At present, the current organizational system of medical care for patients under medical supervision in the implementation of high-risk preventive strategy is characterized by a number of significant shortcomings, while the improvement of organizational forms with the use of telemedicine technologies can have a significant positive impact on medical efficiency.

The study was conducted in accordance with the standards of Good Clinical Practice and the principles of the Helsinki Declaration, as well as in accordance with the permission of the Ethics Committee of the City of St. Petersburg, which ensured the ethics and reliability of the results of the study.

In total, the study could involve patients aged 18 to 65 years who were under medical supervision with functional disorders of the cardiovascular system (HD I and II), with detected arterial hypertension. A prerequisite for inclusion in the study of patients was the absence of a severe form of concomitant pathologies, such as diabetes mellitus, cirrhosis of the liver of class B and C, chronic kidney disease with reduced glomerular

filtration rate, severe bronchial asthma, actively occurring malignant oncological diseases, mental illnesses.

The sample consisted of: patients with functional impairment, in the presence of modified risk factors for the development of cardiovascular diseases - obesity, overweight, smoking, hypertension (as a risk factor); women 18-40 years old with hypercholesterolemia; patients with functional disorders of the cardiovascular system against the background of insufficient awareness and reduced motivation.

Regardless of gender and age, the group was divided according to the degree of arterial hypertension. In order to monitor blood pressure, medical personnel were consulted on the organization and application of remote blood pressure monitoring.

Patients were provided with electronic automatic tonometers of the same model, which allowed patients to independently monitor blood pressure indicators and transmit data via Bluetooth.

The software product assumes additional synchronization and backup using a free cloud service. Unregistered users can keep their health diaries offline (data is only stored on the smartphone). The software product also involves synchronization and export/import of activity indicators, sleep, exercise, heart rate, weight, blood pressure, blood glucose, spirometry, respiratory rate, blood oxygen and body temperature; hemodynamic indicators. The application is recommended for patients to clarify the presence or absence of arterial hypertension, verify the diagnosis and determine treatment methods. In addition, the application provides the patient with the opportunity to pair other devices, for example, with tonometer sensors or a watch for measuring blood pressure.

After the measurement, the results are provided to the patient in a convenient form and sent to the server. For feedback and reminders to the patient about the need to measure blood pressure and take medications, SMS messages are used, which are sent to the patient's mobile phone. In addition, if necessary, the application provides the physician with the opportunity to discuss the correction of therapy with the patient by phone. Application has the function of plotting graphs and statistical diagrams, which allows to

analyze the dynamics of the patient's condition. This helps the physician to monitor the course of the disease and make more informed decisions about further treatment tactics.

The application uses remote regular medical monitoring to improve the quality of hypertension treatment, allowing patients and medical personnel to stay in constant contact and exchange information about the patient's condition. This improves compliance with recommendations, early detection of complications and generally increases medical efficiency.

Each patient was given an informational consultation by the medical professionals on how to register in the application and, if necessary, connect the patient to perform remote blood pressure monitoring. In addition, at least three remote consultations were conducted, which mainly concerned antihypertensive therapy. During the first month of follow-up, patients received an average of 5 consultations.

This approach to the study made it possible to provide patients with conditions under which they could transmit their BP readings at a convenient time for them and receive timely consultations, which is especially important for elderly people or patients with cognitive disabilities.

After registration in the application, all information about the events was displayed in the personal accounts of attending physicians, who evaluated blood pressure monitoring charts daily, made treatment adjustments if necessary, or called the patient for an appointment. Each patient took at least 6 blood pressure measurements.

Statistical processing was carried out according to 6 measurements that most informatively reflect the clinical presentation of the patient. Of the entire group, the results of 3000 SBP and DBP measurements transmitted by the software product from 250 patients fully met these criteria.

All the measurements were conditionally divided into periods: the beginning of the study - the first period, the second period (the middle or midpoint of the study) and the third period (the end of the study when target blood pressure values are reached). For each conditional period (beginning and end of the period) 2 measurements were taken for processing.

Thus, the analysis of the identified shortcomings of the current organizational system of medical care for cardiac patients under medical observation allowed us to identify reserves for its improvement through the use of remote blood pressure monitoring in patients within the framework of structural and functional technology of the organization of medical care. This will increase the level of patient satisfaction, as well as the quality and efficiency of medical care provided.

4.3 Rationale for the use of remote blood pressure monitoring with the null hypothesis

When checking the normality of the distribution of blood pressure measurement results in the general sample, we found that, in general, there is a normality of the distribution in terms of systolic blood pressure (SBP) throughout the treatment, with the exception of incoming figures at the time of the start of measurements and treatment.

The sample structure allowed us to identify four groups of patients with different degrees of AH of systolic blood pressure (SBP) and diastolic blood pressure (DBP).

At the beginning of the study, based on the results of the first measurements, the group with high normal blood pressure (120-139 and 70-89 mmHg) was the largest; 115 people (46%) were included in the "yellow zone"; and the smallest group with BP values of the 3d degree arterial hypertension (≥180 and ≥110 mmHg, "red zone") amounted to 10 people (4%) (Table 4.1).

Table 4.1 – Distribution of blood pressure indicators of patients by degree of arterial hypertension at the beginning of the use of remote dynamic monitoring as part of a high-risk strategy

HD categories	Outpatient SBP, mmHg	Outpatient DBP, mmHg	All patients	
			n	%
High normal BP	120-139	70-89	115	46.0
AH 1 deg.	140-159	90-99	75	30.0
AH 2 deg.	160-179	100-109	50	20.0
AH 3 deg.	≥ 180	≥ 110	10	4.0

Patients with arterial hypertension of the 1st degree (140-159 and 90-99 mmHg) and the 2nd degree (160-179 and 100-109 mmHg) were distributed in the "lilac" and "orange" zones, respectively.

When checking the normality of the distribution of blood pressure measurement results in the general sample, we found that, in general, there is a normality of the distribution in terms of systolic blood pressure (SBP) throughout the treatment, with the exception of incoming figures at the time of the start of measurements and treatment (Figure 4.2).

The results of testing the equality of dispersions of systolic blood pressure (SBP) and diastolic blood pressure (DBP) using two-sided F-test in men by periods revealed that there were no statistically significant differences in the dispersions of SBP and DBP between periods in both men and women.

As a result of testing hypotheses about statistical significance of differences in systolic blood pressure (SBP) indices in men using two-sided Student's t-criterion with equal variance and with different variances, it was found that there were significantly significant relationships between SBP indices before treatment and after treatment, as well as in the middle of treatment and after treatment.

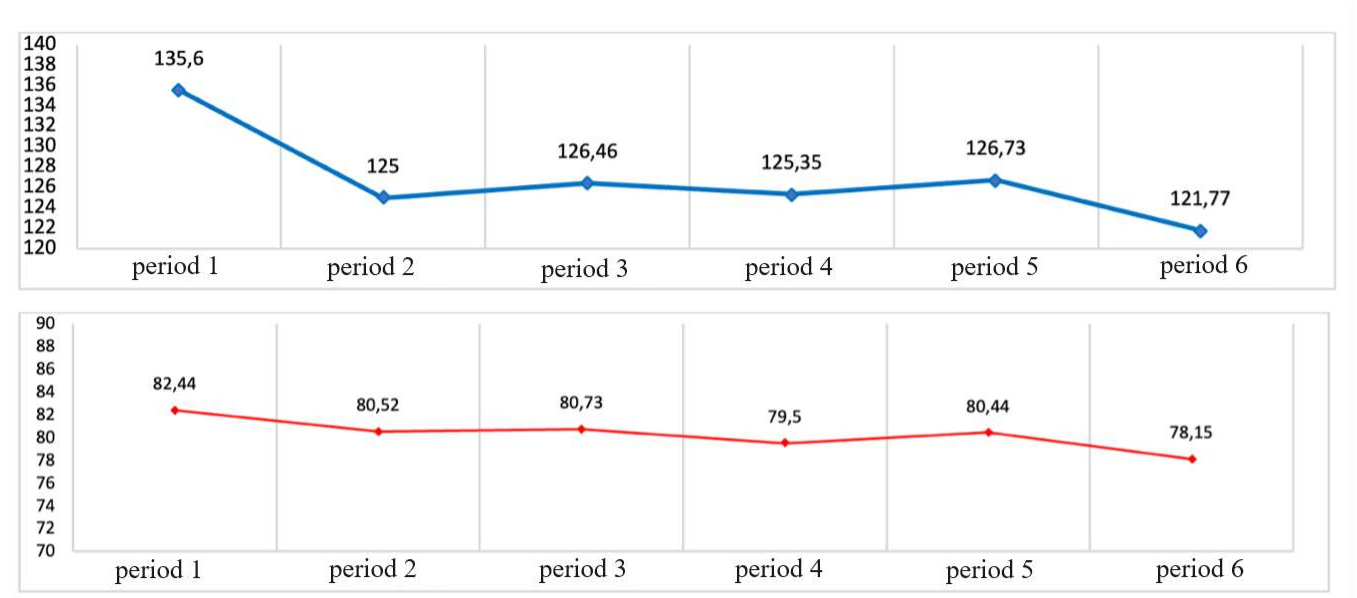

Figure 4.2 - Results of normality testing of systolic blood pressure and diastolic blood pressure measurements in the general sample

For each pair of male SBP measures (e.g., SBP1 and SBP2), t-statistics, p values for one-sided test, critical t value in one-sided test, p value for two-sided test, and critical t value in two-sided test are presented. For example, for SBP1 and SBP5 measurements, the t-statistic value is 2.39, corresponding to p=0.01, indicating a significant difference between the SBP values in these two periods with 95% confidence. No significant differences were found for other pairs of indicators, such as SBP2 and SBP5, SBP3 and SBP5, SBP3 and SBP6. Thus, based on the hypothesis testing carried out, it can be concluded that there are statistically significant differences in SBP indicators between some periods in men. However, it should be noted that not all differences reach the level of statistical significance.

No statistically significant differences in diastolic blood pressure (DBP) between different periods in men were found when hypotheses about the statistical significance of differences in DBP in men were tested using two-sided Student's t-criterion.

As a result of testing hypotheses about statistical significance of differences in systolic blood pressure (SBP) indices in women using two-sided Student's t-criterion with the same variance and with different variances (assuming independence of samples), a

statistically significant difference in indices between SBP1 and SBP6 in women was observed. At the same time, the significance of differences in diastolic blood pressure indices in samples in women using two-sample t-test with the same variance and with different variances no significant differences in DBP indices were revealed.

When the hypothesis of significance of differences between related samples of the total (men + women) was tested using a paired two-sample t-test for mean SBP values, significant differences were found in pre-treatment, mid-treatment, and post-treatment values. No such differences were found for the DBP indicators.

Based on the hypothesis testing carried out, the following conclusions can be drawn:

1. On the presence of statistically significant differences in systolic blood pressure (SBP) between some periods in men using two-sided Student's t-criterion - both for equality of variance and for difference. However, not all differences reach the level of statistical significance. Detailed results and t-statistics, p-values, and critical values are reported for each pair of male SBP measures.

2. For diastolic blood pressure (DBP) in men, no statistically significant differences were found between the different periods using two-sided Student's t-test.

3. For systolic blood pressure (SBP) in women, a statistically significant difference was found between SBP1 and SBP6 using two-sided Student's t-test. No statistically significant differences were found for DBP in women.

4. In general, when testing the hypothesis of significance of differences in the mean values of SBP and DBP using paired two-sample t-test for common samples (men + women), significant differences in the values of SBP before treatment, in the middle of treatment and after treatment were revealed. No such differences were found for the DBP indicators.

4.4 Rationale for the use of remote blood pressure monitoring by non-parametric method

When using descriptive statistics, it is important to consider the type of data and the distribution parameters characterized by asymmetry indicators and distribution histogram. The most frequently used criteria for testing the hypothesis of the distribution law are the criterion $\chi 2$ and the Kolmogorov-Smirnov criterion.

Non-parametric methods are considered less powerful than parametric because they sometimes fail to reveal statistical patterns that can be identified using parametric methods. At the same time, non-parametric methods are more reliable in cases where there is doubt that the analyzed feature has a normal distribution. For normally distributed features, parametric and non-parametric methods give close results (Figure 4.3 and Figure 4.4).

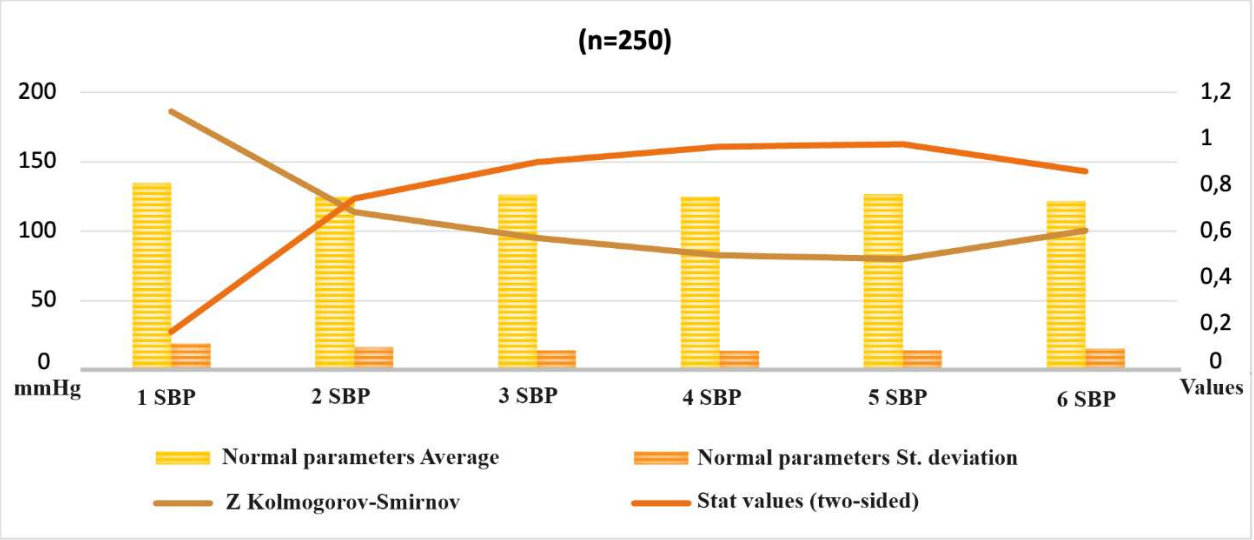

Figure 4.3 - Results of changes in systolic blood pressure in patients of the study group using the one-sample Kolmogorov-Smirnov criterion

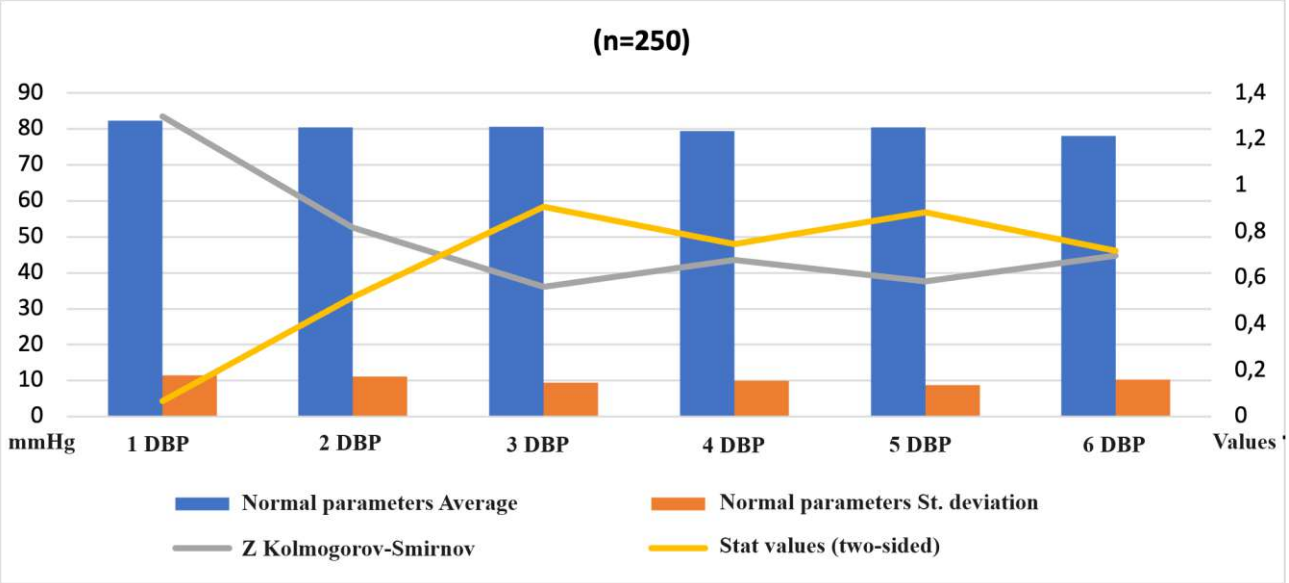

Figure 4.4 - Results of changes in diastolic blood pressure in patients of the study group using the one-sample Kolmogorov-Smirnov criterion

Based on the conducted test of normality of distribution using the Kolmogorov-Smirnov criterion, the following conclusions can be drawn:

1. For a sample of 250 individuals, it was found that the empirical distribution of blood pressure values did not differ significantly from the normal distribution. This means that the distribution of BP values roughly corresponds to the normal distribution.

2. When statistical values (two-sided) were compared to the p=0.05 level of significance, it was found that the value of statistical error in all results exceeded this level. This means that there are no statistically significant differences between the empirical distribution of BP and the normal distribution. That is, the indicators of the empirical distribution are quite close to the normal distribution.

In specific cases of comparing samples or analyzing dependent variables, differences can be found. To obtain more accurate and reliable results, it is recommended to conduct additional research and perform more detailed statistical analysis.

Thus, when checking the normality of distribution using the Kolmogorov-Smirnov criterion, it was found that the empirical distribution of BP values does not significantly differ from the normal distribution, i.e., approximately corresponds to it ($p>0.05$).

Since the calculations show a level of $p>0.05$, it can be concluded that the distribution of BP values corresponds to the distribution of values in the general population, i.e., it corresponds to the normal distribution.

At the same time, since the sample populations include 250 observed individuals (130 men and 120 women), non-parametric criteria were used to test hypotheses about the presence or absence of differences between samples, in particular, the Friedman criterion for comparing two or more related samples (Table 4.2).

Table 4.2 – Results of measurements of diastolic blood pressure (DBP) in women (n=120)

	M±CO	Rank	$\chi 2$	p
1-Diastolic blood pressure (DBP)	82.65±13.1	4.13	13.52	0.019
2-Diastolic blood pressure (DBP)	79.56±12.9	3.59	1.80	0.180
3-Diastolic blood pressure (DBP)	79.74±9.9	3.96	2.91	0.088
4-Diastolic blood pressure (DBP)	76.43±11.6	2.74	3.86	0.050
5-Diastolic blood pressure (DBP)	81.13±9.8	3.85	0.05	0.827
6-Diastolic blood pressure (DBP)	77.22±11.6	2.74	1.19	0.275

Following six measurements of DBP in a sample of women (n=130), using the Friedman criterion, it was found that statistically significant differences at the $p<0.05$ level were observed between the first and fourth measurements ($\chi2=3.86$, $p=0.050$), and between the first and sixth measurements ($\chi2=13.52$, $p=0.019$).

In men (n=130), statistically significant differences at the level of $p<0.05$ in terms of DBP were not observed (Table 4.3).

In general, there were no statistically significant differences at the level of $p<0.05$ in the sample based on the results of six DBP measurements.

Thus, our hypothesis was confirmed that by the middle of the average follow-up period, blood pressure, regardless of the gender of patients and its degree, reached the target values (120-129 and 80-84 mmHg).

To test hypotheses about the presence or absence of differences between the samples, nonparametric criteria for measuring SBP in women were used, in particular, the Friedman criterion for comparing two or more related samples (Table 4.4).

Based on the results of six measurements of SBP in a sample of women (n=120) using the Friedman criterion, it was found that statistically significant differences at the level of $p<0.05$ were observed between all six measurements ($\chi2=23.28$, $p=0.000$; $\chi2=5.26$, $p=0.022$; $\chi2=6.54$, $p=0.011$; ($\chi2=8.90$, $p=0.003$; $\chi2=6.54$, $p=0.011$; $\chi2=8.90$, $p=0.003$).

In men (n=130), statistically significant differences at the level of $p<0.05$ in terms of systolic blood pressure were observed between the first and sixth measurements ($\chi2=12.45$, $p=0.029$) (Table 4.5).

According to the data obtained using the Friedman criterion, statistically significant differences were found at the level of $p<0.05$ in women in terms of both systolic and diastolic pressure, and in men – only one of the six measurements of systolic pressure.

Table 4.3 – Results of measurements of diastolic blood pressure in men (n=130)

Measurement results	M±CO	Rank	$\chi 2$	p
1-Diastolic blood pressure (DBP)	82.24±10.2	3.50	4.29	0.509
2-Diastolic blood pressure (DBP)	81.40±9.4	3.74	0.04	0.835
3-Diastolic blood pressure (DBP)	81.64±9.3	3.40	0.04	0.841
4-Diastolic blood pressure (DBP)	82.32±7.2	4.02	0.39	0.532
5-Diastolic blood pressure (DBP)	79.80±7.9	3.08	0.05	0.827
6-Diastolic blood pressure (DBP)	79.00±9.1	3.26	1.50	0.221

Table 4.4 – Results of measurements of systolic blood pressure (SBP) in women (n=120)

	M±CO	Rank	$\chi 2$	p
1-Systolic blood pressure (SBP)	136.13±21.2	4.87	23.28	0.000
2-Systolic blood pressure (SBP)	124.48±18.3	3.50	5.26	0.022
3-Systolic blood pressure (SBP)	125.17±16.9	3.76	6.54	0.011
4-Systolic blood pressure (SBP)	123.08±17.4	2.80	8.90	0.003
5-Systolic blood pressure (SBP)	126.04±16.7	3.54	6.54	0.011
6-Systolic blood pressure (SBP)	121.69±18.6	2.52	8.90	0.003

Table 4.5 – Results of measurements of systolic blood pressure in men (n=130)

	M±CO	Rank	$\chi 2$	p
1-Systolic blood pressure (SBP)	133.20±17.8	4.10	12.45	0.029
2-Systolic blood pressure (SBP)	125.48±14.3	3.38	2.66	0.102
3-Systolic blood pressure (SBP)	127.64±11.0	3.86	0.04	0.835
4-Systolic blood pressure (SBP)	126.60±9.7	3.54	1.96	0.162
5-Systolic blood pressure (SBP)	127.36±11.8	3.70	1.00	0.317
6-Systolic blood pressure (SBP)	121.84±12.3	2.42	3.52	0.061

4.5 Results of the use of remote blood pressure monitoring in patients of working age in outpatient settings

During the remote dynamic observation of blood pressure, it was noted that in patients with arterial hypertension of the 3rd degree by the end of the first and the beginning of the second period of observation blood pressure indices stabilized to the level of AH of the 1st degree and AH of the 2nd degree, and by the end of the third period in some patients BP reached target values (120-139 and 70-89 mmHg). Patients with arterial hypertension of 2 and 1 degrees also showed a significant improvement in blood pressure.

4.5.1 Evaluation of medical efficiency of remote blood pressure monitoring

The structure of distribution of patients' blood pressure indices by degree of arterial hypertension at the end of the study changed. The number of patients with hypertension of 2 degree decreased by 5 times (from 20% at the beginning of the study to 4% at the end of the study), the number of patients with hypertension of 1 degree decreased by 3 times (from 30% at the beginning of the study to 10% at the end of the study), and the number of patients with high normal blood pressure decreased by 40% (from 46% to 4% at the end of the study. And thus, a new group of patients (82%) with normal blood pressure appeared (Table 4.6).

Table 4.6 - Distribution of patients' blood pressure indices by degree of arterial hypertension at the end of the study

HD categories	Outpatient SBP, mmHg	Outpatient DBP, mmHg	All patients	
			n	%
Normal BP	120-129	80-84	205	82.0
High normal BP	130-139	70-89	10	4.0
AH 1 deg.	140-159	90-99	25	10.0
AH 2 deg.	160-179	100-109	10	4.0
AH 3 deg.	≥ 180	≥ 110	0	0

Thus, as a result of application of organizational and functional technology of medical care organization with the use of remote monitoring it was possible to normalize blood pressure indices in 86% of patients. Such results were achieved due to the redistribution of functional responsibilities of medical professionals and participatory interaction with patients. This indicates the efficiency of the measures taken and the positive medical effect.

Given the above, the proposed method of remote blood pressure monitoring can be considered scientifically justified and recommended for use in outpatient settings.

4.5.2 Evaluation of social efficiency of remote blood pressure monitoring

Earlier we noted that the typical organization of medical dynamic examination of patients has a number of shortcomings, which indicate the need to improve the provision of medical care within the framework of a high-risk strategy.

One of the most effective in the prevention of arterial hypertension is a participatory approach. It consists in active interaction between medical professionals and the patient on the virtual pages of "Schools of remote blood pressure monitoring". This allows to get acquainted with information from a reliable source at a convenient time for the patient, which forms an idea of the disease and risk factors for its development, and also increases motivation to lead a healthy lifestyle.

The use of this approach is important not only in the medical, but also in the social aspect, since it contributes to the adaptation of patients to the presence of chronic pathology. Information obtained from a reliable source helps to combat emotional stress caused by a new idea of a person's own health.

The most important elements of the online "School of remote blood pressure - monitoring" are: teaching the technique of blood pressure measurement; informing about the rules of drug treatment and its possible complications; providing literature. These elements make a significant contribution to the prevention of cardiovascular diseases and help to increase patients' motivation to maintain and improve their health.

In view of the above, we can recommend to use the experience of organizing distance learning activities used on the sites in the practice of SPb GBUZ "City Polyclinic No.19" and SPb GBUZ "City Polyclinic No.91". Such preventive work carried out within the framework of the high-risk strategy is aimed at patients with risk factors for developing cardiovascular diseases, arterial hypertension, and especially at people with a low level of awareness in order to increase their motivation for a healthy lifestyle.

Results of the sociological survey of patients

One of the main criteria for the availability of medical care is an indicator of social efficiency. In turn, a common indicator of social efficiency is the level of patient satisfaction with the medical services provided. In order to assess patients' satisfaction with the organization of medical dynamic examination, we conducted an online survey of patients selected for participation in the study.

The survey assessed the respondents' subjective opinions about the organization of medical care within the framework of a high-risk strategy and the level of their satisfaction with awareness of telemedicine technologies, including the method of remote monitoring.

All patients who attended the online "School of remote blood pressure monitoring" as well as remote monitoring participants were asked to anonymously answer several ranked questions. Based on the results of the survey, the coefficient of social efficiency (K_{sef}) of remote blood pressure monitoring was calculated according to the formula:

$$K_{sef} = \frac{Ny}{No} \text{ x}100,$$

where K_{sef} is the coefficient of social efficiency;

N_s is the number of cases of patient satisfaction with the criteria of medical care provided;

N_e is the number of evaluated cases.

The maximum degree of achievement of the social outcome should aim for 100%.

The first stage of the sociological survey revealed a low level of patient satisfaction with both the organization of medical care within the framework of a high-risk preventive strategy and the provision of information about telemedicine technologies, including remote blood pressure monitoring. The results of the survey before and after the remote blood pressure monitoring method are shown in Tables 4.7, 4.8.

Table 4.7 - Evaluation of patient satisfaction before remote blood pressure monitoring and attending the online "School of remote blood pressure monitoring" (%)

Criteria	Satisfied			Not satisfied			Find it difficult to answer
	Rather YES	Satisfied	Total	Rather NO	Not satisfied	Total	
Organization of medical supervision	1.0	8.0	9.0	0.4	19.5	23.5	67.5
Availability of health information	35.5	7.0	42.5	08.5	14.0	22.5	35.0
Availability of information about risk factors	32.5	07.5	40.0	30.0	22.5	52.5	07.5
Physician-patient interaction	4.5	19.0	23.5	31.5	39.0	70.5	6.0
Willingness to recommend the online "School of remote blood pressure monitoring"	1.5	6.0	7.5	37.5	40.0	67.5	25.0
Remote blood pressure monitoring	7.0	27.0	34.0	31.5	14.5	46.0	20.0

Table 4.8 - Evaluation of patient satisfaction after remote blood pressure monitoring and attending the online "School of remote blood pressure monitoring" (%)

Criteria	Satisfied, in points			Not satisfied, in points			Find it difficult to answer
	1	2	total	1	2	total	
Organization of medical supervision	39.5	55.5	95.0	6.0	0.0	1.5	3.5
Availability of health information	16.5	75.0	91.5	1.0	0.0	1.0	7.5
Availability of information about risk factors	5.0	87.5	92.5	0.0	0.0	0.0	7.5
Physician-patient interaction	10.0	80.0	90.0	0.0	0.0	0.0	10.0
Willingness to recommend the online "School of remote blood pressure monitoring"	1.0	71.5	72.5	22.5	0.0	22.5	5.0
Remote blood pressure monitoring	2.0	83.0	85.0	10.0	0.0	10.0	5.0

Upon completion of the analysis of the results, it was found that after remote blood pressure monitoring, the level of patient satisfaction increased according to all criteria (Figure 4.5).

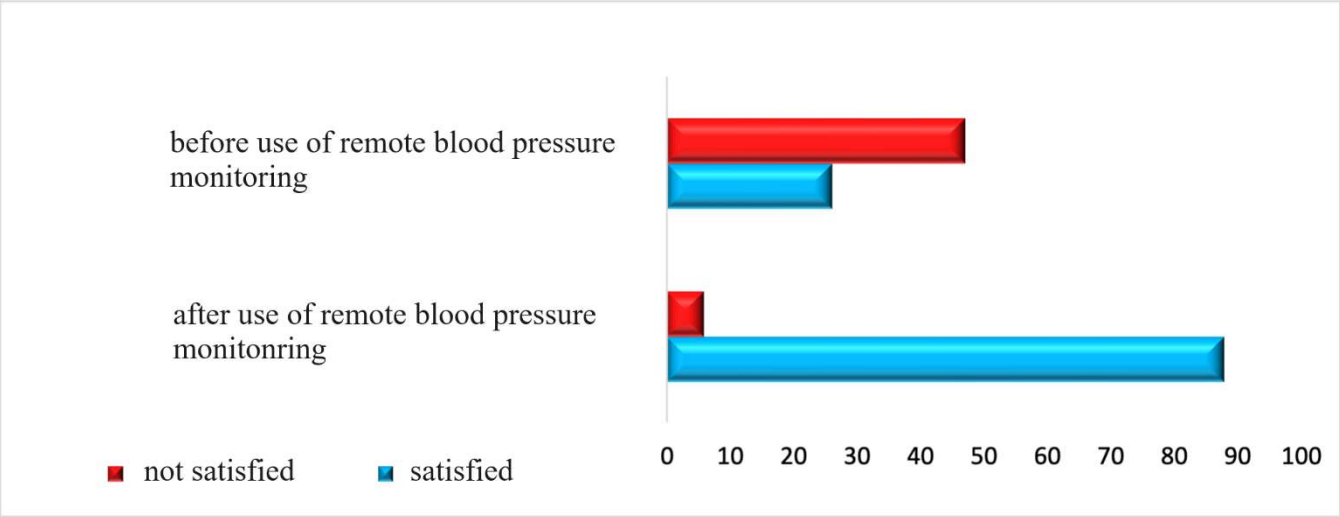

Figure 4.5 - Change in patient satisfaction before and after remote blood pressure monitoring and attending the online "School of remote blood pressure monitoring"

The data obtained demonstrate that, in general, the level of achieving a social result after remote blood pressure monitoring increased to 87.7% compared to the beginning (26.0%).

It is important to note that such an increase in the social efficiency indicator was achieved as a result of the application of organizational and functional technology for the organization of medical care, taking into account the redistribution of functional responsibilities of medical professionals and participatory interaction with patients.

Results of the sociological survey of medical personnel

To achieve the goal of the third phase of the study (2018-2019), a medical and social survey of health personnel was conducted to determine the level of satisfaction with their work. The study was conducted using a specially designed structured questionnaire consisting of 14 questions (Appendix N) relating to aspects such as work environment, professional development opportunities and interaction with patients.

100 primary health care professionals were interviewed, of whom 25.0% were male and 75.0% were female, with a mean age of 42.1 and 41.8 years, respectively. Medical experience in men was 15.0±7.2 years, in women – 11.0±5.4. Age composition of health professionals by groups: 18-30 years, 31-40 years, 41-50 years and 51 years and older (Figure 4.6). 200 questionnaire responses before and after online "School of remote blood pressure monitoring" were processed.

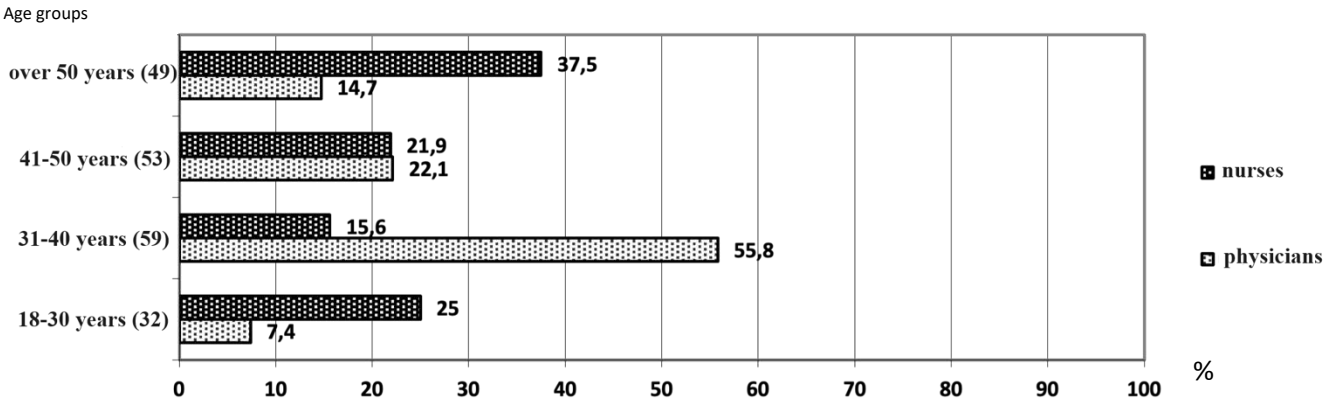

Figure 4.6 - Characterization of the age composition of primary health care professionals (2018 -2019), distribution by age groups

68 physicians participated in the survey, among whom a significant proportion (77.9%) were between 31 and 50 years of age (55.8% and 22.1%, respectively). Participants over the age of 51 made up 14.7% of the respondents, young professionals aged 18 to 30 years – 7.4%.

There were almost half as many nurses who took part in the survey – 32 people. It is encouraging that a quarter of them were young specialists aged 18 to 30 years (25%). The main number of respondents were specialists aged 31 to 50 years (15.6% and 21.9%, respectively), as well as professionals over 51 years of age 37.5%.

The results of the survey of health care professionals regarding preventive counseling and use of remote blood pressure monitoring are presented in Table 4.9.

Table 4.9 – Distribution of opinions of medical professionals on preventive counseling and remote monitoring of blood pressure (%)

Do you think…	Medical professionals	Response criteria						
		Rather YES than NO	YES	Total	Find it difficult to answer	Rather NO than YES	NO	Total
that the use of remote blood pressure monitoring has made your work easier?	**physicians**	0.0	54.4	**54.4**	**33.8**	0.0	11.8	**11.8**
	nurse	0.0	53.1	**53.1**	**15.6**	3.2	28.1	**31.3**
that a brief preventive consultation of patients within the framework of dispensary observation is useful?	**physicians**	0.0	47.1	**47.1**	**38.2**	2.9	11.8	**14.7**
	nurse	0.0	46.9	**46.9**	**25.0**	9.4	18.7	**28.1**

The use of remote blood pressure monitoring will significantly facilitate the work of professionals of medical institutions: this is the opinion of both physicians and nurses. This is confirmed by the data presented in the table.

As a result of opinion analysis, 54.4% of physicians said that the use of remote blood pressure monitoring significantly facilitated their work; 33.8% of physicians were neutral on this issue. The remaining 11.8% of physicians considered remote monitoring of patients' blood pressure to be a factor complicating their work.

The majority of nurses (53.1%) characterized remote monitoring of patients' blood pressure as facilitating their work; 15.6% could not decide on an answer; one-third (31.3%) of nurses expressed a negative opinion on this issue.

About half of physicians and nurses (47.1% and 46.9%, respectively) expressed a positive opinion about the usefulness of brief preventive counseling of patients as part of medical follow-up. 14.7% of physicians and 28.1% of nurses found this practice useless, while a significant proportion of physicians (38.2%) and a quarter of nurses (25.0%) found it difficult to answer this question.

Thus, during the survey, most healthcare professionals reported that using remote blood pressure monitoring and providing brief preventive counseling to patients greatly facilitated and improved their work. At the same time, the analysis of the results of the study shows that some of the professionals spoke on this issue neutrally or negatively.

Before using the new structural and functional technology of organization of medical care delivery, primary health care professionals were interviewed about satisfaction/dissatisfaction with their professional activities.

Both physicians and nurses cited excessive workloads during work (77.5% of respondents) and low wages (61.6%) as the leading reasons for dissatisfaction with professional activities.

Further, medical professionals noted the lack of opportunities for training and self-improvement during work, as well as the lack of mutual understanding with colleagues (59.9% and 50.9%, respectively). In addition, physicians and nurses expressed dissatisfaction due to lack of understanding with management and conflicts with patients (41.2% and 46.0%, respectively). At the same time, in general, physicians and nurses were equally satisfied with their work - 75.0%.

The main criteria and answers of medical personnel to the questions of the questionnaire on satisfaction/dissatisfaction with their activity are presented in Table 4.10.

Table 4.10 - Results of healthcare professionals' opinions on the reasons for satisfaction/dissatisfaction with their activities before the use of remote blood pressure monitoring (%)

Criteria	Medical professionals	Satisfied			Not satisfied			Find it difficult to answer
		Rather YES	Satisfied	Total	Rather NO	Not satisfied	Total	
Mutual understanding with colleagues	physician	8.8	4.4	**13.2**	19.1	54.4	**73.5**	**13.3**
	nurse	18.7	25.0	**43.7**	9.4	18.8	**28.2**	**28.1**
Total average:		**13.7**	**14.7**	**28.5**	**14.2**	**36.6**	**50.9**	**20.6**
Mutual understanding with management	physician	11.8	35.3	**47.1**	10.3	16.2	**26.5**	**26.4**
	nurse	18.8	0.0	**18.8**	31.2	34.4	**65.6**	**15.6**
Total average:		**15.3**	**35.3**	**33.0**	**20.7**	**25.3**	**46.0**	**21.0**
Conflict situations with patients	physician	10.3	11.8	**22.1**	14.7	32.3	**47**	**30.9**
	nurse	18.7	21.9	**40.6**	9.4	25.0	**34.4**	**25.0**
Total average:		**14.5**	**16.9**	**31.3**	**12.5**	**28.9**	**41.2**	**27.5**
Work load	physician	5.9	13.2	**19.1**	11.8	58.8	**70.6**	**10.3**
	nurse	0.0	9.4	**9.4**	9.4	78.1	**87.5**	**3.1**
Total average:		**5.9**	**11.3**	**15.8**	**10.6**	**68.4**	**77.5**	**6.7**
Remuneration of labor	physician	11.8	14.7	**26.5**	11.8	36.7	**48.5**	**25.0**
	nurse	3.1	9.4	**12.5**	28.1	46.9	**75.0**	**12.5**
Total average:		**7.4**	**12**	**19.6**	**19.8**	**41.8**	**61.6**	**18.8**
The possibility of learning and self-improvement while working	physician	13.2	14.7	**27.9**	13.2	44.2	**57.4**	**14.7**
	nurse	6.3	12.5	**18.8**	28.1	34.4	**62.5**	**18.7**
Total average:		**9.7**	**13.6**	**23.4**	**20.6**	**39.3**	**59.9**	**16.7**
Satisfaction with their activities in general	physician	0.0	75.0	**75.0**	0.0	23.5	**23.5**	**1.5**
	nurse	0.0	75.0	**75.0**	0.0	25.0	**25.0**	**0.0**
Total average:		**0.0**	**75.0**	**75.0**	**0.0**	**24.0**	**24.0**	**1.0**

Application of a new structural and functional technology of organization of medical care delivery using remote blood pressure monitoring and redistribution of functional responsibilities of medical personnel led to an increase in the level of satisfaction of medical personnel with their professional activities (Table 4.11).

Table 4.11 - Results of healthcare professionals' opinions on the reasons for satisfaction/dissatisfaction with their activities before the use of remote blood pressure monitoring (%)

Criteria	**Medical professionals**	**Satisfied**			**Not satisfied**			**Find it difficult to answer**
		Rather YES	Satisfied	**Total**	Rather NO	Not satisfied	**Total**	
Mutual understanding with colleagues	physician	19.1	61.8	**80.9**	8.8	4.4	**13.2**	**5.9**
	nurse	9.4	34.4	**43.8**	15.6	18.7	**34.3**	**21.9**
Total average:		14.3	48.1	**62.4**	12.2	11.4	**23.6**	**14.0**
Mutual understanding with management	physician	13.2	39.7	**52.9**	10.3	14.7	**25**	**22.1**
	nurse	18.8	9.4	**28.2**	28.1	31.2	**59.3**	**12.5**
Total average:		16.0	24.5	**40.5**	19.2	22.9	**42.1**	**17.3**
Conflict situations with patients	physician	17.7	39.7	**57.4**	10.3	8.8	**19.1**	**23.5**
	nurse	18.8	28.0	**46.8**	15.6	18.8	**34.4**	**18.8**
Total average:		18.2	37.0	**52.1**	12.9	13.8	**26.7**	**21.2**
Work load	physician	4.4	11.8	**16.2**	19.1	58.8	**77.9**	**5.9**
	nurse	3.1	6.3	**9.4**	12.5	78.1	**90.6**	**0.0**
Total average:		3.7	9.1	**12.9**	15.8	68.5	**84.2**	**2.9**
Remuneration of labor	physician	11.7	22.1	**33.8**	29.4	17.7	**47.1**	**19.1**
	nurse	15.6	31.2	**46.8**	31.2	15.6	**46.9**	**6.4**
Total average:		13.6	26.5	**40.3**	30.3	16.5	**46.9**	**12.8**
The possibility of learning and self-improvement while working	physician	13.2	17.7	**30.9**	14.7	41.2	**55.9**	**13.2**
	nurse	12.5	12.5	**25.0**	31.3	28.1	**59.4**	**15.6**
Total average:		12.8	15.1	**27.9**	23	34.6	**57.7**	**14.4**
Satisfaction with their activities in general	physician	4.4	73.5	**77.9**	0.0	20.6	**20.6**	**1.5**
	nurse	3.1	75.0	**78.1**	0.0	18.8	**18.8**	**3.1**
Total average:		3.7	74.2	**78.0**	0.0	19.7	**19.7**	2.3

According to the results of the use of the new structural and functional technology of the organization of medical care, it was noted that the satisfaction of professionals with their activities as a whole increased by 3%.

The level of personnel satisfaction by the criterion "Mutual understanding with colleagues" increased by 34.0%; the indicator of conflict situations with patients - by

10.9%. The level of satisfaction with the criterion "Mutual understanding with management" increased by 7.5% (this increase was noted primarily among physicians).

The growth of satisfaction with the evaluation criterion about the possibility of training and self-improvement during working hours showed an increase of 3.6%, however, the level of dissatisfaction with this criterion is still shown to be high (57.7%). The indicator of dissatisfaction with the low level of labor remuneration also decreased by 14.8%, but still remained at a high level - 46.9%.

The indicator of satisfaction with the workload showed negative dynamics (-3.8%), and mainly at the expense of nurses - by 6.4%. Perhaps these results will be useful in determining directions for organizing the work of medical professionals.

Thus, the application of structural and functional technology of organization of medical care with the use of remote blood pressure monitoring, taking into account the redistribution of functional responsibilities of medical personnel in outpatient settings led to an increase in the level of satisfaction of medical professionals in various aspects by 73.8%. The greatest increase in satisfaction is noted for communicative criteria - mutual understanding with colleagues and management, conflict situations with patients. To a lesser extent - the opportunity for training and self-improvement during working hours and the level of remuneration. Significant reserves have been identified in the organization of work of medical personnel to identify areas for their solution.

Summing up the above, it should be said that the revealed reserves of the existing system of organization of medical care delivery to cardiac patients under medical supervision allowed to define approaches to its improvement due to the proposed new structural and functional technology with the use of remote blood pressure monitoring in patients within the high-risk strategy.

With the help of remote monitoring, it was possible to normalize blood pressure indicators in 86% of patients. This indicates the efficiency of structural and functional technology of the organization of medical care, as it is aimed at the prevention of cardiovascular diseases and the adherence of patients to therapy.

The proposed structural and functional technology is based on making organizational decisions on redistribution of functional responsibilities of medical personnel and participative interaction of all participants of the treatment and prevention process.

The use of this technology increases the availability of medical care and makes it possible to evaluate not only remote blood pressure monitoring as a separate medical service, but also the quality of medical care provided in outpatient settings.

The results obtained demonstrate an increase in social efficiency after the use of remote monitoring of blood pressure. In addition, the results of the study indicate existing problems related to the level of satisfaction of medical personnel. These problems require further study. The obtained results can be used to determine priorities for increasing the satisfaction of medical professionals with the level of remuneration and the possibility of training and self-improvement during working hours.

The results of this stage of the study allow us to consider remote blood pressure monitoring as a key element of structural and functional technology of the organization of medical care for cardiac patients as scientifically justified with proven medical and social efficiency as a result of its use.

CHAPTER 5 PROPOSALS FOR IMPROVING THE ORGANIZATION OF MEDICAL CARE USING A NEW STRUCTURAL AND FUNCTIONAL TECHNOLOGY WITH THE USE OF REMOTE BLOOD PRESSURE MONITORING IN PATIENTS

The active application of advanced information and communication technologies in health care requires improvement of the legislative and regulatory framework in the healthcare system.

5.1 Improvement of medical information technologies within a single digital circuit

The Roadmap of the National Technological Initiative approved on 20.12.2016 by the decision of the Presidium of the Presidential Council for Economic Modernization and Innovative Development of Russia is a strategic project of the President of the Russian Federation. The Healthnet project is an open ecosystem that supports and develops companies that create, produce and provide biotechnological and medical products and services that lead to significant improvements in human health and quality of life in Russia and around the world. It is among the markets of the National Technology Initiative.

The Decree of the President of the Russian Federation dated 07.05.2018 No.204 "On national goals and strategic objectives for the development of the Russian Federation for the period until 2024" noted that, along with solving other tasks, the introduction of innovative medical technologies, including the system of early diagnosis and remote health monitoring, will make it possible to ensure the availability of medical services for the population of our country.

The federal project "On approval of the concept of creating a Uniform State Health Information System in the field of healthcare (USHIS)", which is part of the national project "Healthcare", is aimed at ensuring the availability of digital services for citizens

through the introduction of electronic document management, including telemedicine technologies, electronic physician's appointments, electronic prescriptions, as well as at improving the efficiency of the healthcare system by creating mechanisms for interaction of medical organizations based on USHIS, the introduction of digital technologies and platform solutions that form a single digital health circuit.

To date, issues of informatization in the healthcare system are being addressed within the framework of the Regional Medical Information System (RMIS) using the state information system "Regional fragment of the unified state information system in the field of healthcare", connected to a secure data transmission network and equipped with automated workplaces. Through these systems, information exchange between medical organizations of St. Petersburg is implemented.

Since 2018, the implementation of the federal projects of the Unified Digital Circuit (UDC) and the Vertically Integrated Medical Information System (VIMIS) has entailed changes in the legislative framework in terms of regulation of the issues of information support for medical organizations, including day inpatient facilities.

The main principle of the introduction of the Uniform State Health Information System (USHIS) and the implementation of the UDC project is standardized information exchange between different information systems of medical and pharmaceutical organizations, which ensures uniform maintenance of electronic medical records.

For this purpose, a subsystem, the Electronic Medical Document Registry (EMDR), was created to help create, register, store, search and exchange electronic medical documents between medical and pharmaceutical organizations.

Since 2020, within the framework of the requirements established by the Ministry of Health of the Russian Federation for state information systems in the field of healthcare, medical records in the form of electronic medical documents have been maintained. However, the maintenance of electronic medical records should provide for the exchange of medical information between the medical organization's MIS, the regional system and the USHIS. The standard for information exchange is a structured

electronic medical document (SEMD), which has a clear structure and a generally accepted format.

In accordance with the new regulations and recommendations of the Russian Ministry of Health, St. Petersburg should ensure the integration of the medical information system (MIS) of medical organizations and USHIS, including through the regional information system of St. Petersburg, connection to EMDR. The envisaged connection of MIS of medical organizations to EMDR will ensure the completeness of formation, registration and access to electronic medical documents, which will make it possible to organize continuity in the treatment of patients receiving medical care in various medical organizations providing medical care in outpatient and inpatient settings.

One of the topical areas of digitalization of healthcare is the so-called mobile health (mHealth) - implementation of organizational, clinical, epidemiological, preventive and educational aspects of healthcare through the integrated use of mobile communication devices, network information resources, application software (mobile applications) and personal (wearable) devices.

Currently, there are over 100 thousand applications specifically designed for healthcare on Android and iOS platforms.

The main application areas of mobile medical applications:

- prevention of diseases and promotion of a healthy lifestyle, which includes the fight against bad habits, informing the population about possible risk factors and early markers of disease development;
- calculation of individual diagnostic indicators and physiological parameters;
- remote monitoring of the patient's condition, monitoring of the efficiency of treatment, adherence and accuracy of patients' compliance with medical prescriptions;
- advisory (informational) support for physicians and patients.

The use of computer technologies for disease prevention includes the use of various mobile applications for leading a healthy lifestyle (wellness), for physical training

POWeR Tracker and sports (fitness) with control of certain physiological and anthropometric indicators, combating bad habits, compiling and adjusting the diet, etc.

These applications have varying degrees of complexity and can be used by the patient both independently and when interacting with a physician – "physician-patient".

Applications to monitor the course of the disease for patient, physician and treatment and preventive measures are actively used by patients with arterial hypertension. In fact, special mobile diaries are being created, in which blood pressure values are entered at different times of the day. The data is processed, systematized and can be presented in a convenient form for further analysis both to the attending physician, paramedic or nurse and to the patient himself with appropriate recommendations. The main purpose of these applications is remote monitoring of the patient's condition, increasing adherence to treatment and reducing cardiovascular risk.

Since the approval of the Russian Government Resolution dated 28.12.2022 No.2469, a pilot project "Personal Medical Assistants" using remote high-tech devices and services - personal medical assistants - has been launched. The most important task of the project is to form a normative and methodological base for physicians to fully work with remote monitoring data when making a diagnosis and adjusting treatment.

Mobile health is one of the significant projects in medicine, which will significantly improve accessibility and quality of medical care, public awareness, simplify diagnostic procedures, reduce financial costs and improve the management of the healthcare system as a whole.

5.2 Key areas for improving human resource capacity

Improving the provision of medical care in outpatient settings depends to a large extent on the quality of education, qualifications and training of medical personnel.

To organize and conduct remote blood pressure monitoring in patients with arterial hypertension, the level of training of nursing personnel - the most significant part of the human resource of a medical organization - is especially important. A properly and

rationally organized process of remote blood pressure monitoring will ensure positive results in the optimal time.

Currently, there is an active discussion in the medical community about the proposals of the Central Research Institute for Organization and Informatization of Healthcare of the Ministry of Health on the redistribution of part of medical powers between physicians and nursing personnel.

The recommended changes in organizational approaches to the provision of primary health care provide for the transfer of some functions that are not directly related to the process of providing medical care, but provide for the performance of administrative functions by non-medical professionals.

Functions that can be distributed between a district general practitioner and personnel with secondary medical education:

- conducting medical examinations (preventive, preliminary, periodic);
- medical monitoring of the health status of persons suffering from chronic diseases;
- determination of medical indications for the introduction of restrictive measures (quarantine), evaluation of the efficiency and safety of the use of medicinal and non-medicinal methods of treatment;
- reporting on their activities, active home visits to low-mobility patients for dynamic monitoring, organizing and conducting Schools of remote blood pressure monitoring (Appendix I).

At the main stage of the organization and conduct of the study, in the process of remote blood pressure monitoring, we encountered a problem that consisted in the lack of information on this issue both among patients and medical personnel.

Taking into account this circumstance, it was decided to develop proposals for making changes to educational programs for training medical personnel and additional programs for retraining and advanced training of secondary medical personnel. High-quality training of medical personnel in the use of remote blood pressure monitoring can be provided through close cooperation between medical and educational organizations.

In preparation for the organization and implementation of remote monitoring of patients' blood pressure, we organized consultations for medical personnel at their workplaces, including not only the issues of competence improvement in its implementation, but also preventive talks on risk factors for cardiovascular diseases and complications. Emphasis was placed on active work with errors in the organization and implementation of remote blood pressure monitoring.

Timely adjustment of educational programs for training, professional retraining and advanced training of medical personnel will make it possible to provide medical professionals with secondary medical education with knowledge on the use of remote blood pressure monitoring in the shortest possible time.

In accordance with the order of the Ministry of Health of the Russian Federation dated 21.11.2017 No.926 "On Approval of the Concept of Development of Continuing Medical and Pharmaceutical Education in the Russian Federation for the period until 2021", a multi-level system of continuing professional education was formed, including for nursing personnel. It implies, among other things, a high proportion of independent training of medical personnel with further control using the methods offered by the system of continuing medical education (CME).

Advanced training of secondary medical personnel is carried out by mastering additional professional educational programs once every 5 years, according to the order of the Ministry of Health of the Russian Federation dated 03.08.2012 No.66n "On approval of the Procedure and deadlines for improving professional knowledge and skills by medical and pharmaceutical professionals through training in additional professional educational programs in educational and scientific organizations".

The Order of the Ministry of Health of the Russian Federation dated 15.03.2021 No.205n approved the Procedure for choosing a medical professional training program in an organization engaged in educational activities for referral to additional professional education at the expense of the normalized insurance reserve of the territorial compulsory medical insurance fund.

In accordance with the Regulations on accreditation of specialists approved by the Order of the Ministry of Health of the Russian Federation dated 28.10.2022 No.709n, medical professionals have the opportunity to independently choose the trajectory of training through interactive and educational professional development activities posted on the Internet portal of continuing medical and pharmaceutical education in the information and telecommunications network "Internet".

During the organization and conduct of scientific research, it was noted that increasing the competence of personnel on the organization and conduct of remote blood pressure monitoring in patients will quickly ensure a positive medical effect from its use.

For medical personnel engaged in remote monitoring of blood pressure, a memo was written on the use of remote blood pressure monitoring (Appendix F), and also a "Control card of regular medical observation using remote blood pressure monitoring" (Appendix C) was proposed for use.

An information memo on the use of remote blood pressure monitoring has been developed for patients (Appendix D).

For medical professionals studying at advanced training courses, a methodological development has been written for conducting a seminar, the plan of which is displayed in Appendix K.

Questions on the application of the method of remote blood pressure monitoring were included in the educational process of the Department of Health Care Organization and Public Health in the training of physicians, paramedics and nurses. They are reflected in the methodological development of the practical lesson (Appendix G), as well as in the work program of the discipline "Nursing in the system of primary healthcare for the population" of the St. Petersburg State University for the Training of Chief Nurses (Appendix K).

When conducting such classes, it is obligatory to consider the analysis of identified deficiencies in the provision of preventive care to patients in outpatient settings using the method of remote blood pressure monitoring.

All the changes made in the educational process for nursing personnel are based on the types of activities approved by the Federal State Educational Standards for "Nursing" for specialists with secondary and higher education, as well as the professional standard "Medical nursing personnel". These documents specify the guidelines for improving functions in the implementation of measures to prevent NCD and promote healthy lifestyle, medical record keeping, communication skills and knowledge on the use of telemedicine technologies in medicine.

Thus, the experience gained in the process of remote blood pressure monitoring in patients during the implementation of structural and functional technology of the organization of medical care, allowed to identify areas to improve the competence of physicians and nursing personnel and to ensure the continuity of development of skills and competencies of nurses.

Regular trainings, consultations and exchange of experience between colleagues will help to maintain motivation and improve the quality of work. This will help to improve the quality of medical care, especially in terms of the use of telemedicine technologies, including remote monitoring of not only blood pressure, but also other health indicators of patients.

It is necessary to strengthen the interaction of educational institutions and medical organizations in the development of educational programs for secondary medical personnel, taking into account the needs of practical healthcare, for example, the use of medical organizations as training and practical centers.

During the organization and conduct of scientific research, it was noted that increasing the competence of personnel on the organization and conduct of remote blood pressure monitoring in patients will quickly ensure a positive medical effect from its use.

5.3 Recommendations on the use of remote blood pressure monitoring for medical personnel

The main state program "Development of Healthcare", approved by the Decree of the Government of the Russian Federation dated 26.12.2017 No.1640 is designed for implementation until 2024. It includes organizational and economic restructuring of medical healthcare organizations aimed at increasing the availability of medical care and ensuring its quality corresponding to the level of incidence of the country's population. It also includes the national project "Healthcare" and the federal (regional) project "Fight against cardiovascular diseases", designed for 2019-2024.

An important direction in the development of modern healthcare is the Concept of predictive, preventive, participatory and personalized medicine, the order of approval of which was signed by the Minister of Health of the Russian Federation in 2018 (Order No.186 dated 24.04.2018). It takes its name from its four fundamental principles: personalization, predication, prevention and participatory.

1. Personalized approach (personalization) is an individual approach to the patient and his health, taking into account his physiological, genetic and biochemical features.

2. Prediction is identification of predisposition to the development of diseases.

3. Prevention means taking all possible measures to reduce the risk of developing the disease.

4. Participation is the involvement of the patient in the treatment process. This principle is sometimes called "partnership". Thanks to this partnership between the physician and the patient, it becomes possible to implement the entire concept. The patient is motivated to participate in prevention and treatment, he makes an informed choice and takes responsibility for his health.

"4P Medicine" is a format based on an individual approach to each patient, which aims to pre-symptomatic detection of diseases and their risk factors, as well as predicting the development of diseases and developing a set of preventive measures (Fig. 5.1).

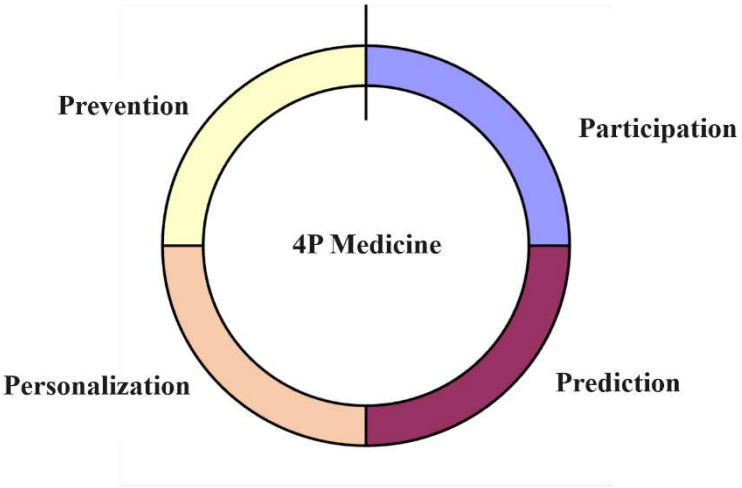

Figure 5.1 – The concept of the "4P Medicine" model

Human health is a value and the most important state resource of the country, so in modern conditions the development of "4P Medicine" is a progressive and priority direction of preserving and strengthening the health of the population.

Mechanisms for implementing the concept should provide for the improvement of training and professional development of personnel in topical areas of medical science and related fields, such as molecular biology and genetics, cell biology, bioinformatics, mathematical statistics, as well as other natural sciences. Based on this amount of information, it is possible to develop a personalized approach to the prevention and treatment of diseases, which will reduce the risk of their development and complications and improve the health of the population as a whole.

The development of "4P Medicine" is changing the approach to the healthcare system, focusing on individual needs and disease prediction. This means a transition from a reactive approach, where treatment begins after the development of the disease, to a preventive approach, where the emphasis is on preventing the development of the disease and maintaining health.

The implementation of the principles of "4P Medicine" requires an active physician-patient interaction, where the patient actively participates in the process of preventive measures and collaborates with the physician on prevention and treatment.

This involves patients' awareness and knowledge of their health status and risks, and a willingness to take action to maintain and improve their health.

Creating conditions for the organization of medical care with the use of remote blood pressure monitoring in outpatient settings is an additional approach to the development of "4P Medicine" and a progressive change in the overall model of the healthcare system.

The use of remote blood pressure monitoring allows to minimize cardiovascular complications and increases the availability of medical care. This method allows to obtain a positive medical effect of its application on the background of reduction of cardiovascular risks in the medium term.

Remote monitoring is a medical service (***A02.12.002.002***) and must be provided to the insured person at the expense of compulsory health insurance or through another channel of financing for medical indications. The time intervals for receiving patients within the framework of remote monitoring are currently not defined by regulatory legal acts. These intervals may be regulated by the internal procedure of the medical organization, as they depend on the objectives of monitoring, the list of monitored parameters, the frequency and regularity of their measurements, as well as reference values of the monitored parameters, the expected duration of the program, the regularity and timing of scheduled face-to-face appointments (consultations, examinations) and the specifics of emergency response. The main purpose of the application of remote blood pressure monitoring is to create an effective model of remote medical monitoring in outpatient settings.

The main participants of the method of remote patient monitoring are medical organizations providing primary health care (polyclinic, outpatient clinic, FAP, FP, health center), physician (district therapist, general practitioner), paramedic (in cases stipulated by the current regulations). These medical organizations should carry out:

- primary outpatient admission of patients and selection of candidates for remote blood pressure monitoring;

- appointment and adjustment of treatment according to the recommendations for remote monitoring;

- registration of informed consent with the patient;

- repeated therapeutic and diagnostic techniques of patients under remote observation;

- entering information on event processing.

The objectives of the method of remote blood pressure monitoring (observation) are:

- increasing the coverage of medical monitoring of patients with cardiovascular diseases;

- approbation of telemedicine technologies with the use of remote blood pressure monitoring and creation of a unified methodology for dynamic medical monitoring;

- improving the medical efficiency of medical monitoring (increasing adherence to treatment, ensuring the achievement of target values, reducing the proportion of complications).

Participants of remote blood pressure monitoring can be patients registered at a regular medical check-up with the following cardiovascular diseases: hypertension without damage and with damage to target organs, diseases and conditions in the presence of which medical monitoring is established and which correspond to the Procedure for providing medical care to patients with CVD (Order of the Ministry of Health of the Russian Federation dated 15.03.2022 No.168n "On approval of the procedure for conducting regular medical supervision of adults"; Order of the Ministry of Health of the Russian Federation dated 15.11.2012 No.918n "On approval of the Procedure for providing medical care to patients with cardiovascular diseases").

Procedure for organizing medical care for patients with arterial hypertension using remote blood pressure monitoring

Primary specialized medical and sanitary care with the use of remote blood pressure monitoring was provided by cardiologists, district general practitioners and

general practitioners (family physicians) in outpatient settings on referral from specialist physicians when patients applied to a medical organization on their own, and also when patients consulted remotely using information technologies. To achieve better results from the use of remote blood pressure monitoring, it is recommended to redistribute functional responsibilities between physicians and nurses.

1. When a patient applied to a medical organization on an outpatient basis, the attending physician conducted a face-to-face consultation.

2. In order to provide primary health care in case of exacerbation of chronic cardiovascular diseases that are not life-threatening and do not require emergency and urgent medical care, in the structure of medical organizations (offices), a decision was made to include patients in the program of remote blood pressure monitoring. The commission consisted of 2 or more professionals (attending physician or cardiologist, doctor for medical prevention and head of the department).

3. Prior to enrollment in the remote blood pressure monitoring program, the patient was given an information sheet on remote blood pressure monitoring.

Functions of non-medical personnel:

- monitoring of patients' transfer of vital signs (BP, pulse, blood O_2 content, etc.);
- conducting a telephone survey and timely response to the lack of vital signs data;
- filling in the necessary paper and electronic documentation.

The fundamental element of the proposed organizational technology with the application of remote blood pressure monitoring in patients on the basis of participatory interaction is the redistribution of functional responsibilities of medical professionals. The functions of medical and non-medical personnel are pre-medical assessment of the patient's health and determination of the urgency of providing him with medical care.

Functions of the nursing personnel of a medical organization in the provision of medical care using remote monitoring:

- issuance of the registrar, if necessary, filling in the patient's personal account;
- patient training, issuance of an information memo;

- filling in the necessary paper documentation, entering information into the electronic system for setting up a patient for monitoring and receiving and transferring devices;

- conducting a telephone survey, remote indicators monitoring, filling out the necessary documentation for medical observation programs (depending on the program);

- response in case of destabilization of the patient's condition: a call to the patient's personal phone number or to the phone number of close relatives or other legal representatives of the patient, an appointment of the patient for a medical consultation using telemedicine technologies, a call for emergency medical services (EMS) in case if situation requires urgent intervention.

Functions of a cardiologist, district therapists, general practitioners (family physicians) providing medical care with the use of remote blood pressure monitoring:

- prescription of remote blood pressure monitoring;

- conducting a medical consultation with the use of telemedicine technologies;

- filling out the necessary documentation;

- response in case of destabilization of the patient's condition: a call to the patient's personal phone number or to the phone number of close relatives or other legal representatives of the patient, repeated consultations, if necessary, a call for emergency medical services (EMS) in case if situation requires urgent intervention.

As a result of the analysis of the organization and implementation of remote blood pressure monitoring to patients in outpatient settings as part of a high-risk preventive strategy, we determined a list of recommendations for its use (Table 5.1).

Table 5.1 - Recommendations for improving the organization of medical care using a new structural and functional technology with the use of remote blood pressure monitoring

Recommendations	**Expected effect**
1. Regulatory and legal changes necessary to regulate the organization of the use of the method of remote blood pressure monitoring.	
1.1. The Russian Society of Cardiology to amend the Clinical Recommendations "Arterial hypertension in adults" and include the method of remote blood pressure monitoring for patients.	Increasing the coverage of medical monitoring of patients with hypertension. Reduction of complications in patients with HD. Improving the quality and accessibility of medical care.
1.2. Executive authorities to approve the modification of clinical recommendations on arterial hypertension using the method of remote blood pressure monitoring in primary health care.	Reduction of incidence, mortality and the number of complications from hypertension.
1.3. Executive authorities to include in MIS the organizational and functional technology for organizing medical care with the use of remote blood pressure monitoring.	Increasing the availability of medical care. Ensuring the exchange of patient data between various MIS of medical organizations.
1.4. Territorial funds of compulsory medical insurance to include the method of remote blood pressure monitoring in the list of paid medical services.	Improving the quality and accessibility of medical care. Reduction of cases of hospital admissions from cardiovascular diseases.
2. Heads of medical organizations	
2.1 to use a new structural and functional technology of organization of medical care with the use of remote blood pressure monitoring, taking into account the redistribution of functional responsibilities of medical professionals and participatory interaction with patients in outpatient settings.	Changing the order of personnel interaction. Freeing up the physician's time to see patients. Improving the quality and accessibility of medical care provided in outpatient settings.
2.2 Equipping with material and technical equipment.	Improving the working conditions of medical professinals.
2.3 Organization of "Schools of remote blood pressure monitoring".	Improving the quality and accessibility of medical care as part of a high-risk strategy.
2.4 Recommend for use the "Control card of medical observation with the use of remote monitoring".	Providing reporting of the results of remote monitoring of patients.
3. Development of competencies and professional development of medical personnel	
3.1. Development and implementation of training seminars.	Professional development of personnel. Improving the quality of medical care.
3.2. Conducting classes to improve the skills of secondary medical personnel engaged in independent pre-medical reception.	The presence of advanced skills of independent pre-medical reception. Improving the quality of medical care.
3.3. Inclusion of questions on the use of remote blood pressure monitoring in patients in the educational process of training physicians, paramedics and nurses.	Improving the competence of future medical professionals in the application of telemedicine technologies, including remote monitoring of blood pressure in patients. Improving the quality of medical care.
4. A set of measures aimed at improving the organization of medical monitoring of patients within the framework of a high-risk strategy.	
4.1. Application of structural and functional technology of medical care organization with the use of remote monitoring of blood pressure in patients.	Reduction of complications from cardiovascular diseases. Reducing treatment costs and improving the health and quality of life of cardiac patients.
4.2. Conducting regular informational remote events with patients within the framework of the "Schools of remote blood pressure monitoring".	Strengthening the prevention of socially significant diseases. Adherence to treatment of patients on regular medical check-up.

Recommendations	Expected effect
4.3. Redistribution of functional responsibilities between physicians, nurses and non-medical personnel.	Improving the quality and efficiency of medical care as part of a high-risk strategy.

Our recommendations were divided into the following areas:

1. Regulatory and legal changes necessary to regulate the organization of the use of the method of remote blood pressure monitoring;

2. Recommendations to the heads of medical organizations for the equipment of logistics;

3. Development of competencies and professional development of medical personnel;

4. A set of measures aimed at improving the organization of medical monitoring of patients within the framework of a high-risk strategy.

Considering the above, it should be said that the development of digital technologies in the healthcare system and the creation of a Uniform State Health Information System (USHIS) are integral elements of the modern approach to the provision of medical care. This will significantly improve the interaction of medical organizations, ensure fast and secure exchange of medical information, improve the quality of services provided and ensure continuity of care.

In addition, active detection of predispositions to disease development and identification of individual risk factors plays an important role in the prevention and improvement of public health. The implementation of the principles of "4P Medicine" in the digitalization of health care will undoubtedly become more effective with the use of remote blood pressure monitoring, as it is based on prediction, prevention, personalization and active patient participation, which in turn can lead to a more efficient and effective use of health care resources.

However, in order for all these principles to work more effectively, it is important that patients consciously treat their health and be active participants in the therapeutic and preventive process: regular check-ups, compliance with physicians' recommendations, active participation in preventive measures.

Thus, the organization of medical care in accordance with the principles of "4P Medicine", the introduction of structural and functional technology with the use of remote blood pressure monitoring in outpatient settings, taking into account the redistribution of functional responsibilities of health care professionals and participatory interaction with patients are important steps towards achieving quality and affordable health care.

CONCLUSION

One of the priority directions in the development of national health care is to improve the organization of medical care in outpatient settings, aimed at expanding consumer satisfaction with medical services and ensuring the availability of quality medical care. Improvement of approaches to the prevention of cardiovascular diseases in outpatient settings is carried out in accordance with the Decrees of the President of the Russian Federation and other regulatory documents, including: the state program "Development of Healthcare", the national project "Healthcare", the Federal (regional) project "Fight against cardiovascular diseases". The necessary introduction of new advanced information and communication technologies in primary health care requires the study of medical and social approaches to improving the organization of medical care in outpatient settings, taking into account the redistribution of functional responsibilities of health care professionals and participatory interaction with patients, as well as a personal approach in disease management processes.

A review of foreign and domestic literature has shown that recently (2014-2021) part of scientific research highlights an important direction in the organization of medical care using telemedicine technologies. Domestic literature highlights trends in improving the efficiency of the health care system related to the achievements of "4P Medicine", which is based on the principles of personalized approach to the health status of patients, prediction (creating a probabilistic prognosis of health), prevention (preventing the emergence of diseases) and participation (motivated participation of the patient).

According to the literature, in recent years, the primary health care unit has been actively modernized. Through the implementation of the federal project "Creation of a unified digital circuit in health care on the basis of a Uniform State Health Information System (USHIS)", a foundation is being created for the informatization of primary health care and the availability of telemedicine technologies for citizens.

It should be noted, however, that despite the large-scale state measures taken, there are no changes in the structure of incidence and mortality of the population of the Russian

Federation. Cardiovascular diseases continue to occupy a leading position, and arterial hypertension remains the leading health problem in both economically developed and developing countries.

In their works, the authors note that the maximum reduction of cardiovascular risk is possible with an integrated approach to modifying risk factors for the development of cardiovascular diseases. The study of population health indicators and monitoring of the prevalence of cardiovascular disease risk factors become the basis for improving preventive measures in the healthcare system.

Our research consisted of 3 stages. The first stage was aimed at studying medical and social approaches to the organization of medical care for patients with cardiovascular diseases (analysis of incidence and mortality, as well as the prevalence of risk factors for cardiovascular diseases; the current state of CVD prevention; the role and place of telemedicine technologies in the healthcare system).

A retrospective analysis of the existing organization of the work of the office for the prevention of arterial hypertension in the "Cardiometer-MT" system (2014-2018) and patient follow-up performed at the first stage of the study revealed signs of deterioration of the functional state of the cardiovascular system in 60% of patients (hypertension, heart attacks and strokes). The most common of the modifiable risk factors for the development of arterial hypertension in patients who were under dynamic medical supervision were overweight and obesity, tobacco smoking and physical inactivity. They triggered the mechanism of hereditary predisposition, which, together, activated biological risk factors (hypercholesterolemia, high blood pressure). Hypercholesterolemia is significantly more common in women under age of 40 years, and tobacco smoking is more common in men 50 years and older.

The analyzed dynamics of complications of the development of the cardiovascular system on the SCORE scale showed that the relative cardiovascular risk is highest in women aged 18 to 40 years than in men of the same age.

The detected shortcomings allowed us to identify areas for improvement of dynamic regular medical monitoring of patients with risk factors for cardiovascular diseases and arterial hypertension.

We have developed a structural and functional technology for organizing medical care based on participatory interaction of each participant (patient, medical and non-medical professionals), in which we consider "participation" as a conscious and active role of the patient in making decisions about his health.

Patients with signs of deterioration of the functional state of the cardiovascular system against the background of existing risk factors (overweight, obesity and hypodynamia), insufficient (or absent) awareness of them and reduced motivation were selected for the study. The study also involved young women aged 18-40 years without signs of overweight and obesity, but with a high level of hypercholysterinemia and smoking men over 50 years old. These patients underwent a sociological survey based on a specially designed questionnaire. The following were assessed: the level of awareness of risk factors for the development of cardiovascular diseases, self-assessment of health, preventive and medical activity of patients, the importance of social factors on the course of cardiovascular diseases and the frequency of complications.

A high level of knowledge about preventive measures (medical observation, health centers) was noted among respondents of middle (31-50 years old) and older age, in contrast to 18–30-year-olds. Women were the most informed in these matters, and respondents aged 18-30 had greater awareness of the use of telemedicine technologies in healthcare, as expected.

Comparative analysis of respondents' opinions showed that women consider excessive body weight, consumption of alcohol and energy drinks, tobacco smoking and non-compliance with the work and rest regime to be the most significant of the modifiable risk factors for cardiovascular diseases. Women consider monotony of work, lack of physical activity and psychological/emotional burn-out to be less significant risk factors.

Smoking, physical overload and psychological/emotional burn-out were more significant risk factors for men, while alcohol and energy drinks were less significant.

The higher the level of education and income of our respondents (the influence of social family status (married) is also noted), the higher the level of awareness about the risk factors for the development of diseases.

Also, in this phase of the study, correction of modified risk factors was carried out by increasing patient awareness. For this purpose, online "Schools of remote blood pressure monitoring" were created on the websites of polyclinics on the basis of which the research was conducted.

A key element of the structural and functional technology is remote monitoring of patients' blood pressure, based on the redistribution of functional responsibilities between medical and non-medical professionals and well-established participatory interaction between patients and medical personnel. The substantiation of the results of remote monitoring of patients' blood pressure within the framework of a high-risk strategy was organized and carried out on the basis of a software product for mobile applications.

Patients measured their blood pressure and, if necessary, received remote consultations and/or recommendations for the correction of hypotensive therapy. According to the level of blood pressure, all patients were divided into three groups.

All measurements were conditionally divided into three periods that most informatively reflect the clinical presentation of the patient. Each period was divided into two parts – the beginning and the end. For statistical processing, 3000 parameter of patients' SBP and DBP measurements were taken.

At the end of the remote dynamic observation, we noted that the structure of distribution of patients' blood pressure indices by the degree of arterial hypertension changed significantly compared to the beginning of the study. In patients with arterial hypertension of the 3rd degree, blood pressure indicators stabilized to the level of arterial hypertension of the 1st and 2nd degrees. The number of patients with arterial hypertension of the 2nd degree decreased by 5 times, with hypertension of the 1st degree – by 3 times, and the number of patients with high normal blood pressure – by 4 times. Thus, a new group of patients (82%) with normal blood pressure was formed, and in total, blood

pressure indicators were normalized in 86% of patients. This indicates the positive medical efficiency of the use of remote blood pressure monitoring.

The results obtained are associated with the redistribution of functional responsibilities between medical professionals and participatory interaction with patients on the treatment and prevention of hypertension. Therefore, a synergistic effect of remote blood pressure monitoring was obtained on the background of the created conditions and sufficient awareness of patients in the online "School of remote blood pressure monitoring".

Statistical analysis was used to scientifically substantiate the method of remote blood pressure monitoring. The results obtained made it possible to solve one of the research tasks using mathematical calculations. One of the most significant aspects in conducting statistical analysis (visualization, correlation, factor analysis) of a sample is the substantiation of the chosen techniques and their validity in relation to the general population.

To confirm the social efficiency of remote blood pressure monitoring, a sociological survey of patients and medical professionals was conducted. The results of the patient survey showed a positive increase in the social result by 61.7%. The greatest satisfaction of patients is expressed by the organization of medical care with the use of remote blood pressure monitoring and improvement of relationships with medical professionals.

The results of a sociological survey of medical personnel showed that the use of a new structural and functional technology for the organization of medical care and the redistribution of their functional responsibilities in general led to an increase in the level of satisfaction with their activities by 73.8%.

The greatest increase in satisfaction was noted for communicative criteria - mutual understanding with colleagues and management, conflict situations with patients. To a lesser extent - the opportunity for training and self-improvement during working hours and the level of remuneration. Significant reserves have been identified in the organization of work of medical personnel to identify areas for their solution.

The generalized data of the sociological survey conducted among patients and medical profesionals indicate a positive increase in the social result - by 67.7%, due to the use of a new structural and functional technology of the organization of medical care with the use of remote blood pressure monitoring.

The obtained results indicate the achievement of the goal of scientific research on the substantiation and application of structural and functional technology of the organization of medical care using remote blood pressure monitoring. Its use increased the medical and social efficiency of medical care and reduced the risk of complications in working age cardiac patients. In the long term, this will reduce incidence and mortality from cardiovascular disease.

Taking into account the above, the structural and functional technology of the organization of medical care with the use of remote blood pressure monitoring, taking into account the redistribution of functional responsibilities of medical professionals and participatory interaction with patients can be considered scientifically substantiated and recommended for use in outpatient settings.

The developed proposals will contribute to the achievement of accessibility of medical care to the population and the achievement of the goals of state programs for the development of the sector.

FINDINGS

1. The conducted content analysis of literary sources showed that, despite the measures taken, the prevalence of AH in the world during the study period (2017 - 2021) averaged about 20%, and the level of total and primary incidence (on referral) in dynamics increased by 3.7% and 28.6%, respectively. This is due, among other things, to the strengthening of the diagnostic capabilities of medical organizations and the annually increasing coverage of patients by regular and preventive medical examinations. The mortality rate from cardiovascular diseases in Russia for the last 20 years remains at the level of 46-50%. This is 20% higher than in other advanced economies.

2. As a result of in-depth analysis of scientific literature, it was noted that in order to reduce incidence and mortality from cardiovascular diseases it is necessary to identify approaches to improving the organization of medical care for cardiac patients in outpatient settings through the use of advanced information and communication technologies in health care.

3. The conducted retrospective analysis (2014 - 2018) of the primary electronic documentation of the arterial hypertension prevention cabinet and patient follow-up revealed an increase in the prevalence of such behavioral risk factors for cardiovascular disease development as tobacco smoking - by 4.6%, arterial hypertension - by 15.6%, alcohol consumption - by 16.5%, and low physical activity - by 31%. The incidence of total cardiovascular risk increased by an average of 6.5% in women of the most active working age (18-40 years), which is significantly higher than in men of the same age.

4. Statistical processing of the results of retrospective analysis revealed deterioration of the functional state of the cardiovascular system (hypertension, acute myocardial infarction and acute cerebral circulatory failure) in 60% of patients under dynamic medical observation.

5. The study of patients' awareness showed that they are poorly motivated to prevent their risk factors for disease development, poorly informed about the procedure for organizing regular medical monitoring of cardiac patients, and 10-15% of respondents

have no information on the above issues at all. It was in these patients that complications (acute heart attacks and strokes) were noted.

6. According to the results of using the new structural and functional technology of medical care organization with the use of remote blood pressure monitoring taking into account the redistribution of functional responsibilities of medical professionals and participative interaction, BP indices were normalized in 86% of patients, which proves the medical efficiency of its application.

7. Scientific validation of remote blood pressure monitoring was performed by several methods of statistical data analysis. The normal distribution of blood pressure indicators was confirmed. Differences in variances were found and recognized as statistically significant at the level of $p<0.05$.

8. Social efficiency from the use of new structural and functional technology of medical care organization is proved by the results of sociological survey of patients and medical professionals by increasing their satisfaction by 67.7%. The synergistic effect of its application is based on the participative interaction of all participants of the treatment and prevention process and redistribution of functional responsibilities of medical professionals.

9. Proposals for improving the organization of medical care in outpatient settings are based on proven medical and social efficiency through the implementation of a new structural and functional technology with remote monitoring of blood pressure and ensure its availability at the population level.

10. The developed recommendations on the application of the scientifically substantiated method of remote blood pressure monitoring determine the ways of its further use both in practical healthcare and in the educational process in the training of future medical professionals.

PRACTICAL RECOMMENDATIONS

1. To scale up the results of the study, in order to reduce incidence and complications of hypertension, the Russian Society of Cardiology should amend the Clinical Recommendations "Arterial hypertension in adults" and include the method of remote blood pressure monitoring.

2. We recommend that the executive authorities approve the amended clinical recommendations on arterial hypertension using structural and functional technology for organizing the provision of medical care with the use of remote monitoring, and include structural and functional technology for organizing the provision of medical care with the use of remote blood pressure monitoring in medical information systems.

3. Territorial mandatory medical insurance funds are recommended to include the medical service "Remote blood pressure monitoring (***A02.12.002.002***)" in the list of paid services.

4. The heads of medical organizations in their daily work are recommended to create the necessary conditions for optimal operation of the "School of remote blood pressure monitoring".

5. We recommend that medical professionals use the instructions for remote blood pressure monitoring. To raise awareness of patients with risk factors for cardiovascular diseases at the pre-hospital stage - to use electronic information programs for patients, place them on the websites of polyclinics within the framework of online "Schools of remote blood pressure monitoring".

6. When planning and implementing preventive measures against arterial hypertension, medical professionals are recommended to pay special attention to women 18-40 years old, as a category of people who have a high level of relative cardiovascular risk and who rarely visit medical organizations.

7. Selected materials of the study are used in educational processes of: the Department of Health Care Organization and Public Health of Kirov Military Medical

Academy in the training of physicians, nurses, paramedics and at advanced training courses; the medical college of St. Petersburg State University in the training of nurses.

LIST OF ABBREVIATIONS AND SYMBOLS

AH – arterial hypertension

BP – blood pressure

VIMIS – vertically integrated medical information system

WHO – World Health Organization

HD – hypertension disease

DBP – diastolic blood pressure

MDO – medical dynamic observation

DO – dynamic observation

USHIS – uniform state health information system

UDC – unified digital circuit

MH RF – Ministry of Health of the Russian Federation

MIS – medical information system

MO – medical organization

AMI – acute myocardial infarction

ACVA - acute cerebrovascular accident

PHC – primary health care

RF – Russian Federation

REMD – register of electronic medical documents

RMIS – regional medical information system

SBP – systolic blood pressure

NFD RF – Northwestern Federal District of the Russian Federation

CVD – cardiovascular diseases

CVC – cardiovascular complications

CVR – cardiovascular risk

CVM – cardiovascular mortality

SEMD – structured electronic medical document

RF – risk factors

NCD - chronic non-communicable disease

ELR – experimental legal regime

SP – software product

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APPENDICES

APPENDIX A
(informational)

Patient questionnaire

You are invited to participate in an anonymous sociological study. The information obtained in the course of the study will serve as a basis for making recommendations to improve the provision of medical care in outpatient settings.

We ask you to answer the questions yourself, without consulting third parties.

Before answering the question, read it carefully. Pay attention to the explanations to the question in parentheses, if there are any. Choose and tick the answer(s) that corresponds to your opinion. If you are not satisfied with the proposed options, write your own answer.

Attention! The answers will be used in aggregated form. You do not need to specify your last name.

We sincerely hope that you will answer our questions honestly.
Thank you for participating!

1. Your height and weight:

	height
	weight

2. Gender:

1	male
2	female

3. Age_____ (full years):

4. Education:

1	higher
2	average
3	specialized secondary

5. Marital status:

1	married
2	not married

6. Your work activity:

1	employed
2	not employed

7. Specialization:

1	teacher
2	driver
3	medical personnel

other _____

8. What would you say about your family's income in relation to the minimum wage? *Select and mark one answer*

1	enough for everything, even remains
2	we live without any special financial difficulties
3	we live more or less; we have to save
4	enough only for food
5	we live beyond the poverty line (equal to or below the minimum wage)

9. What are you guided by when drawing up a diet (choose only one answer)? *Select and mark one answer*

1	I eat everything that is delicious without thinking
2	I eat what is available by income
3	I try to lose weight according to the recommendations from experts about healthy eating

10. What do you think is one of the most common risk factors for the development of diseases of the circulatory system (CD) and their complications in the form of myocardial infarctions and strokes? *Answer for each line, taking into account the degree from 1 – "not important at all" to 5 – "very important"*

Risk factors		**scores**				
		1	2	3	4	5
1	alcoholic and energy drinks					
2	excess body weight					
3	hereditary predisposition					
4	smoking					
5	non-compliance with the work and rest regime					
6	frequent and prolonged stress (psychoemotional burn-out)					
7	physical burn-out					
8	monotony of work and lack of physical activity					

11. Please, evaluate on a five–point scale how important risk factors for complications from CD are for you personally. *Answer for each line, taking into account the degree from 1 – "not important at all" to 5 – "very important"*

	Risk factors	scores				
		1	2	3	4	5
1	smoking					
2	alcoholic and energy drinks					
3	excess body weight					
4	hereditary predisposition					
5	frequent and prolonged stress (psychoemotional burn-out)					
6	early menopause (in women)					
7	non-compliance with the work and rest regime					
8	monotony of work and lack of physical activity					

12. What do you usually do when you have health problems? *Mark only one, the most appropriate answer*

1	I apply to the state medical organization at my place of residence or work
2	I apply to a private medical organization
3	I use folk recipes
4	I do nothing, it will pass by itself.

13. What hereditary diseases do you know about in you or your relatives? *Answer on each line, bearing in mind that "0" means "none", 4 – "definitely yes"*

	Answers	scores				
		0	1	2	3	4
1	no					
2	diabetes mellitus					
3	obesity					
4	heart attacks, strokes					
5	hypertonic disease					
6	close relatives at an early age (up to 40 years) have hypertensive disease					
7	dyslipidemia					
8	I don't know					

14. Are you aware of...? *Answer on each line*

	Questions:	no	yes
2	"optimal" figures of your blood pressure		
3	health group		
4	being on the dispensary register		
5	body mass index		
6	Health Centers and Schools of arterial hypertension		
7	use of modern gadgets for prevention and reduction of RF development of circulatory diseases		
8	use of devices for remote transmission of BP data from patient to physician		

15. Who helped you in learning how to correctly measure BP and first aid in case of BP elevation? *(Rate from 0 to 3, "0" - if not satisfied, "3" - if completely satisfied)*

Answers:		scores			
		0	1	2	3
1	there was no one to help me				
2	health care provider				
3	relatives (friends)				
4	self-learning through the media				

16. How long does it take you to wait for an appointment with a general practitioner or specialist?

1	0-15 minutes
2	16-30 minutes
3	30-45 minutes
4	45-60 minutes
5	60 and more

17. Mark on a five-point scale the organization of work of the polyclinic.
Answer for each line, taking into account the degree from 1 – "not important at all" to 5 – "very important"

questions		scores				
		1	2	3	4	5
1	Is it easy for you to get to the medical organization (polyclinic)?					
2	Is the territorial location of the polyclinic convenient for you?					
3	Are the working hours of doctors at the polyclinic convenient for you?					
4	How would you assess the overall professional level of the personnel at the polyclinic?					
5	How satisfied are you with the care you received at this outpatient clinic?					
6	accessibility of the information received about the work of the polyclinic, working hours of physicians, electronic record					

18. Are you satisfied with the extent to which you were informed about the disease and its treatment at your physician's appointment? *Select and mark the option with the most appropriate, in your opinion, rating from 0 to 3 according to the degree of your satisfaction*

About the disease			**About treatment**			**About prevention and risk factors for the development of diseases**		
not satisfied	more or less	satisfied	not satisfied	more or less	satisfied	not satisfied	more or less	satisfied
1	2	3	1	2	3	1	2	3

19. If you are NOT satisfied, have you had difficulties with your physician or nursing personnel (or are you not completely satisfied) and what is the reason? *Select and mark the option with the most appropriate, in your opinion, rating from 0 to 3 according to the degree of your dissatisfaction*

Answers		**physicians**					**nurse**			
		scores					**scores**			
1	there were difficulties	yes	no	1	2	3	0	1	2	3
2	inattention of medical personnel									
3	rudeness of medical personnel									
4	excessive slowness									
5	low competence of medical personnel									

20. In your opinion, how can the work of a medical organization be improved? *Select and mark the option with the most appropriate, in your opinion, please rate from 0 to 3, 0 - low, 3 - high*

Answers		**scores**			
		0	1	2	3
1	teach ethics and psychology in dealing with patients				
2	improvement of professional knowledge and skills				
3	reduction of work with medical records and increase time for the patient				
4	material incentives for the best specialists				
5	free choice of physician by the patient				
6	free choice of medical organization by the patient				
7	the ability to apply information remotely from patient to physician				

APPENDIX B
(informational)

QUESTIONNAIRE
of the participant in the online "School of Arterial Hypertension" to assess satisfaction with medical care using remote blood pressure monitoring and outpatient services

We ask you to take part in a short anonymous survey. All data obtained as a result of this survey will be used only in aggregated form. Any opinion you may have is very important to us. It will be considered in our future work.

Please pay attention to the order of filling out the questionnaire. The questions contain possible answers. Evaluate the level of your satisfaction with these criteria and choose the one that matches your opinion best.

1. How satisfied are you with the organization of regular medical observation?

- ☐ Satisfied
- ☐ More satisfied than not satisfied
- ☐ Rather not satisfied
- ☐ Not satisfied
- ☐ I find it difficult to answer

2. **How satisfied are you with the procedure for providing information about your health status?**

- ☐ Satisfied
- ☐ More satisfied than not satisfied
- ☐ Rather not satisfied
- ☐ Not satisfied
- ☐ I find it difficult to answer

3. **How satisfied are you with the procedure for providing information about risk factors for developing diseases?**

- ☐ Satisfied
- ☐ More satisfied than not satisfied
- ☐ Rather not satisfied
- ☐ Not satisfied
- ☐ I find it difficult to answer

4. Please evaluate the interaction between the physician and the patient:

- ☐ Satisfied
- ☐ More satisfied than not satisfied
- ☐ Rather not satisfied
- ☐ Not satisfied
- ☐ I find it difficult to answer

5. **Are you ready to recommend the "School of Arterial Hypertension" and the method of remote blood pressure monitoring to your friends and relatives?**

- ☐ I am ready to recommend
- ☐ More ready to recommend than not to recommend
- ☐ Rather not ready to recommend than recommend
- ☐ I'm not ready to recommend
- ☐ I find it difficult to answer

6. **Are you satisfied with the availability of medical care using remote blood pressure monitoring?**

- ☐ Satisfied
- ☐ More satisfied than not satisfied
- ☐ Rather not satisfied
- ☐ Not satisfied
- ☐ I find it difficult to answer

THANK YOU FOR PARTICIPATING
IN OUR SURVEY!

APPENDIX C
(advisory)

Organization of the online "School of remote blood pressure monitoring" Information and methodological material for patients

All citizens' rights are insured in accordance with Federal Law No. 323-FZ of 21.11.2011 "On the Basics of Public Health Protection in the Russian Federation" and Federal Law No. 326-FZ of 29.10.2010 "On Compulsory Medical Insurance in the Russian Federation".

The content of information and methodological material for patients in the online "School of remote blood pressure monitoring" of the City Polyclinic No. 19 https://policlinica19.ru /

Introduction
Effects of tobacco and tobacco smoking on the body
Healthy nutrition in hypertension
Drug treatment of hypertension
Stress and hypertension
Physical activity and health
What is AH?

TAKE A QUALITY ASSESSMENT SURVEY
https://docs.google.com/forms/d/1nFcQ43g0lpSA5NfxKh5jhI9PoU_iOhFtXhufT2Stxxk/

The content of information and methodological material for patients in the online "School of remote blood pressure monitoring" of the City Polyclinic No. 91 http://gp91.ru/shkola-arterialnoj-gipertenzii

Introduction
Effects of tobacco and tobacco smoking on the body
Healthy nutrition in hypertension
Drug treatment of hypertension
Stress and hypertension
Physical activity and health
What is AH?

TAKE A QUALITY ASSESSMENT SURVEY
https://docs.google.com/forms/d/e/1FAIpQLScUdiSfDykcmZ51yIEBzMzE2lzDSogNnjhRz3BIEc7E6AOGAg/viewform?vc=0&c=0&w=1&flr=0

APPENDIX D
(advisory)

"Control chart of medical follow-up using remote blood pressure monitoring".
Analytical report on monitoring

(to be filled in by a paramedic, nurse, general practitioner, GP, family physician, cardiologist)

General information about the patient/medical organization (to be filled in by a nurse):
Full name of the doctor _____

Medical organization _____
Full name or I of the patient: _____
Age_____
Gender_____
Height/weight/BMI_____
Diagnosis: (ICD code) _____
Initial values of monitored indicators (depending on the DDN program): _____
General information about the program_____
(to be filled in by a nurse):
Program name_____
Start date of the DDN_____
Duration of the monitoring program_____
Date of completion of the observation_____
Number of days with measurements_____
Number of scheduled phone calls_____
Number of additional calls_____
Number of cardiologist consultations during implementation _____
DDN_____
Number of days with critical/significant events _____
Information about taking medications _____
Monitoring results *(to be filled in by the attending physician):*
Target values of the main indicators: achievement (yes/no) _____

Achieved values of the main indicators:

Indicator	Before being included in the program (max/min/aver)			At the end of the program (max/min/aver)		
	max	min	aver	max	min	aver
BP, mmHg						
Heart rate, beats/min						
Right tibia circumference, cm						
Left tibia circumference, cm						

Percentage (%) of measurements with target values from the total number of measurements
taken_____
Significant events for interim reports (appointment of a physician's consultation, EMS call, hospitalization) _____Quantity

APPENDIX E
(advisory)

MEMO TO PATIENTS ON THE USE OF REMOTE BLOOD PRESSURE MONITORING

Remote blood pressure monitoring helps to monitor changes in blood pressure and identify possible health problems even if you don't feel it.

Remote blood pressure monitoring. What is it and why is it needed?

Remote blood pressure monitoring is the process of transmitting blood pressure measurement data by medical devices with Bluetooth, Bluetooth Smart and ANT+ tonometer interfaces over telecommunication communication lines for the purpose of telemedicine counseling and correction of blood pressure.

For patients with risk factors, it is especially important to conduct remote blood pressure monitoring, as this facilitates the diagnosis of hypertension. Hypertension is one of the most common diseases of the cardiovascular system and can lead to serious complications, including heart attack, stroke, etc.

How to prepare for remote blood pressure monitoring?

Before conducting remote blood pressure monitoring, it is necessary to discuss possible contraindications and prohibitions with the attending physician. A medical professional will teach you how to use a blood pressure monitor with the function of remote transmission of blood pressure data, will advise you how to properly apply a cuff and measure pressure to get a more accurate result.

The software product is a mobile application and a personal health diary that can automatically collect data.

Application characteristics

The application offers additional synchronization and backup using a free cloud service. Unregistered users can keep their health diaries offline (data is only stored on the smartphone).

How to register quickly:

Step 1. Download the mobile application to your phone, open it, register in your personal account with an email address.

Step 2. Go to your personal account via the cloud (the upper-most corner on the right).

Step 3. In your personal account, from above, in the control panel, select the "circles" option, go in and open the "invite" window.

Step 4. When you click on the "invite" window, the following window opens: "grant access to your information". Next, you need to enter the email address of the person to whom you grant access to your measurements.

By registering in the program and providing access to personal data, you automatically consent to medical intervention to provide you with medical services **A02.12.002.002** and the processing of personal data.

Customizable features and characteristics of the application

Simple login: The application can be configured to automatically receive data from medical devices (when paired, the settings screen appears); alternatively, it only takes a couple of taps to add an entry to the log manually.

Reminders: Customizable reminders can be set for different repetition intervals and help ensure that measurements and/or pills are taken on time.

Threshold values: Notifications (push or email) can be sent if the measurements of the selected vital signs exceed the set value.

Remote access and data exchange: Application users can export and back up data, as well as print reports from the portal.

You can share health data with your family, friends and doctors. The cloud provides secure storage and up-to-date health log, even if medical or fitness devices change.

Data Security: The application uses all applicable advanced data protection methods: measurements are securely synchronized with the mobile application via HTTPS protocol, and data is stored encrypted on secure servers. Users have full control over their records and can export them or request deletion at any time.

APPENDIX F
(advisory)

MEMO TO MEDICAL/NON-MEDICAL PROFESSIONALS ON THE USE OF REMOTE BLOOD PRESSURE MONITORING

The procedure for organizing the provision of medical care to patients with arterial hypertension using remote blood pressure monitoring.

When a patient applied to a medical organization on an outpatient basis, the attending physician conducted a face-to-face consultation.

In order to provide primary health care in case of exacerbation of chronic cardiovascular diseases that are not life-threatening and do not require emergency and urgent medical care, in the structure of medical organizations (offices), a decision was made to include patients in the program of remote blood pressure monitoring. The commission should consist of 2 or more professionals (attending physician or cardiologist, doctor for medical prevention and head of the department).

Prior to enrollment in the remote blood pressure monitoring program, the patient is given an information sheet on remote blood pressure monitoring.

Functions of the secondary medical personnel of the structural and functional technology of the organization of medical care with the use of remote blood pressure monitoring in patients, taking into account the redistribution of functional responsibilities of medical professionals:

- issuance of the registrar, if necessary, filling in the patient's personal account;
- patient training, issuance of an information memo;

- filling in the necessary paper documentation, entering information into the electronic system for setting up a patient for monitoring and receiving and transferring devices;

- conducting a telephone survey, remote indicators monitoring, filling out the necessary documentation for medical observation programs (depending on the program);

- response in case of destabilization of the patient's condition: a call to the patient's personal phone number or to the phone number of close relatives or other legal representatives of the patient, an appointment of the patient for a medical consultation using telemedicine technologies, a call for emergency medical services (EMS) in case if situation requires urgent intervention.

Functions of a cardiologist, district internists, general practitioners (family doctors), structural and functional technology of organization of medical care with the use of remote blood pressure monitoring in patients, taking into account the redistribution of functional responsibilities of medical professionals:

- prescription of remote blood pressure monitoring;
- conducting a medical consultation with the use of telemedicine technologies;
- filling out the necessary documentation;
- response in case of destabilization of the patient's condition: a call to the patient's personal phone number or to the phone number of close relatives or other legal representatives of the patient, repeated consultations, if necessary, a call for emergency medical services (EMS) in case if situation requires urgent intervention.

Functions of a non-medical personnel structural and functional technology of the organization of medical care with the use of remote blood pressure monitoring in patients, taking into account the redistribution of functional responsibilities of medical professionals:

- monitoring of patients' transfer of vital signs (BP, pulse, blood O2 content, etc.);
- conducting a telephone survey and timely response to the lack of vital signs data;

- filling in the necessary paper and electronic documentation.

Completion of the consultation:

Always comment on the results of the studies provided by the patient, even if the indicators are normal;

Clearly instruct the patient about the recommended lifestyle and actions in certain situations;

Make sure that after the consultation, the patient has reliable information materials.

APPENDIX G

(reference)

KIROV MILITARY MEDICAL ACADEMY

Department of Health Organization and Public Health

APPROVED
Vice-Chairman of the Department
of Health Organization
and Public Health
"___" _____ 20__

METHODOLOGICAL DEVELOPMENT
Plan of practical training

on public health and public health care, health economics

on the topic: "Medical examinations and regular medical examination of the population of the Russian Federation. Regular medical dynamic observation"

Discussed and approved at the meeting of the department Protocol No.__

"_____" _____ 20___
Clarified (supplemented):

«____» _____ _____
(military rank, signature, first name initial, last name)

St. Petersburg, 20___

Topic: "Medical examinations and regular medical examination of the population of the Russian Federation. Regular medical dynamic observation"

Curricular and educational objectives:

1. Curricular objective of the lesson: to develop students' practical skills and acquire skills in

- application of methods, techniques for analyzing the results of the stages of medical examination (preventive examination),

- organization of regular medical monitoring of patients,

- solving problems, making calculations,

- maintaining accounting and reporting forms, registration of medical documentation.

As a result of studying the topic, the cadet (student) must

- be able to:

calculate and evaluate the results of the first stage of medical examination;

use the information obtained for the organization of regular medical monitoring (including for patients with a cardiological profile);

fill in the basic unified forms of accounting and reporting documentation for medical examinations and preventive examinations used in medical organizations providing medical care in outpatient settings.

- be skilled to:

fill out accounting and reporting documentation on medical examination and preventive examination;

determine the patient's health group based on the results of medical examination and preventive examination;

draw up a plan of regular medical observation of patients with a cardiological profile.

2. Educational purpose of the lesson:

- to form motivation for professional self-improvement in the section of preventive work, in particular, medical examination;

- develop responsibility for the correctness of medical documentation.

3. Study time – 4 hours (180 min.); 1 lesson

4. Educational and material support:

Literature:

1. Public health and healthcare: textbook / V. A. Medik. - 4th ed., reprint. and additional – Moscow: GEOTAR-Media, 2021. – 672 p.

2. Medik V.A., Lisitsin V.I., Tokmachev M.S. Public health and healthcare: a guide to practical classes for universities. – M.: GEOTAR-Media, 2018.

3. Organization of medical care in the Russian Federation: textbook / edited by V.A. Reshetnikova. – M.: LLC "Publishing House "IA", 2018. – 432 p.

4. Federal Law No. 323-FZ dated 21.11.2011 "On the Basics of Public Health Protection in the Russian Federation;

5. Order of the Ministry of Health of the Russian Federation No. 404n dated 27.04.2021 "On approval of the procedure for preventive medical examination and medical examination of certain groups of the adult population".

6. Order of the Ministry of Health of the Russian Federation No. 173n dated 29.03.2019 "On approval of the procedure for conducting regular medical supervision of adults".

7. Order of the Ministry of Health and Social Development of Russia dated 23.03.2012 No. 252n (ed. 31.10.2017) "On approval of the Procedure for assigning to a paramedic, midwife by the head of a medical organization when organizing the provision of primary health care and emergency medical care of certain functions of the attending physician for the direct provision of medical care to the patient during the period of observation and treatment, including by appointment and the use of drugs, including narcotic drugs and psychotropic drugs".

8. Order of the Ministry of Health of the Russian Federation No. 834n dated 15.12.2014 "On approval of unified forms of medical documentation used in medical organizations providing medical care in outpatient settings and the procedures for filling them out" (with amendments and additions).

9. Temporary methodological recommendations on the organization of preventive medical examinations and medical examinations in conditions of preserving the risks of the spread of a new coronavirus infection (COVID-19) (approved by the Ministry of Health of the Russian Federation on July 6, 2020)

10. Order of the Ministry of Health of the Russian Federation No. 1207n dated 10.11.2020 "On approval of the registration form of medical documentation No. 131/u "card of preventive medical examination (medical examination)", the procedure for its maintenance and the form of industry statistical reporting No. 131/o "Information on preventive medical examination and medical examination of certain groups of the adult population", the order of its filling and deadlines for submission".

5. Lesson plan and calculation of study time

No. i/o	Training activities and questions	Time (min)
1	2	3
1.	Independent work (preparation) for the lesson	90
	Practical lesson No. 2.15	180
2.	Introductory part: 2.1. Checking the readiness for the lesson (monitoring attendance of classes, compliance with the form of clothing by students, the readiness of technical means of training (TMT)). 2.2. Introduction (announcement of the topic, goals, educational questions and literature on the topic of the lesson). 2.3. Description of the topic (relevance of the topic, its connection with other disciplines and future professional activity).	**15**
3.	Control of the initial level of knowledge of students	15
4.	The main part: the cadets' solution of situational tasks and tests for mastering the topic on the following issues: Question No. 1. Medical examinations and their types established by the legislation of the Russian Federation; 1.1 Analysis of the reference task together with the cadets of situational task No. 1 to work out question No. 1; 1.2 Working out of task No. 1 by cadets and teacher control; 1.3 Conclusions on the development of task No. 1 1.4 Summing up the results of working out question No. 1 Question No. 2. Organizational bases of medical examination and medical supervision; 2.1 Issue of situational tasks No. 2 to work out question No. 2; 2.2 Working out of task No. 2 by cadets and teacher control; 2.3 Conclusions on the development of task No. 2 2.4 Summing up the results of working out question No. 2 Question No. 3. The procedure for conducting medical observations, medical examination, medical supervision; 3.1 Issue of situational tasks No. 3 to cadets to work out question No. 3; 3.2 Working out of task No. 3 by cadets and teacher control; 3.3 Conclusions on the development of task No. 3 3.4 Summing up the results of working out question No. 3 Question No. 4. General principles of remote dynamic monitoring with cardiovascular diseases. 4.1. Issuing a situational task to cadets to work out question No. 5; 4.2. Working out of task No. 4 by cadets and teacher control; 4.3 Conclusions on the development of task No. 4 4.4. Summing up the results of working out question No. 4	120

No. i/o	Training activities and questions	Time (min)
1	2	3
	Question No. 5. Remote blood pressure monitoring as a new method of improving regular medical monitoring of patients with hypertension. 5.1. Issuing a situational task to cadets to work out question No. 5; 5.2. Working out of task No. 5 by cadets and teacher control; 5.3 Conclusions on the development of task No. 5 5.4. Summing up the results of working out question No. 5 Question No. 6. Regulatory legal documents regulating medical observations, medical examination and medical supervision in the Russian Federation; 6.1. Issuing a situational task to cadets to work out question No. 6; 6.2. Working out of task No. 6 by cadets and teacher control; 6.3 Conclusions on the development of task No. 6 6.4. Summing up the results of working out question No. 6	
5.	5.1. Current control of acquired skills	15
6	**The final part:** 1. Conclusion: 2. Assignment for independent work. 3. Answers to students' questions.	15
	Total	180

Teacher E. V. Khugaeva

"___" _____ 20__

APPENDIX I

(reference)

KIROV MILITARY MEDICAL ACADEMY

Department of Health Organization and Public Health

Ex. No. ____

APPROVED
Head of the Department
of Health Organization and Public Health

“____”_____20

SEMINAR PLAN NO. 13 (2.15)

for the discipline: "Health Care Organization and Public Health"

on the topic 2.15: Medical examinations and regular medical examination of the population of the Russian Federation.

Discussed and approved at the meeting of the department
"____" _____ 20___
Protocol No. _____

Clarified (supplemented):
"_____" _____ 20___

(signature, first name initial, last name)

Saint Petersburg – 20__

Topic: Medical examinations and regular medical examination of the population of the Russian Federation.

The contingent of students. Students (cadets) of all faculties

1. The educational goal is to study and improve knowledge on the organization and conduct of medical and regular medical examination of the population of the Russian Federation.

2. The educational goal is to form motivation for professional self-improvement.

Study time: 4 hours (180 min) – 1 lesson.

Lesson plan and calculation of study time

No. i/o	Training activities and questions	Time (min)
1	**2**	**3**
1.	Independent work (preparation) of students for the seminar.	90
	Seminar	
2.	**Introductory part:**	10 min
	1. Checking the readiness for the lesson (monitoring attendance of classes, compliance with the form of clothing by students, the readiness of technical means of training (TMT)). 2. Introduction (announcement of the topic, goals, educational questions and literature on the topic of the lesson). 3. Presentation (relevance of the topic, role and place of this topic in the academic discipline, connection with other disciplines and future professional activity).	
3.	**The main part:**	**120**
	<u>Hearing a report on the topic of the seminar:</u> 1. Medical examination of the adult population as an important tool for the prevention of major non-communicable diseases. Questions to the speaker Discussion on the topic of the report 2. The role of population regular medical examination in the detection of primary incidence of malignant neoplasms. Questions to the speaker Discussion on the topic of the report 3. Technologies of long-term monitoring of arterial pressure: prospects of practical application. Questions to the speaker Discussion on the topic of the report	

No. i/o	Training activities and questions	Time (min)
1	2	3
	Question No. 1. The main historical stages of medical examination of the population in the Russian Federation. control questions on the topic of educational question No. 1 answers of students (cadets) to control questions summing up the results of working out question No. 1 Question No. 2. The system of medical examination of the population in the Russian Federation. control questions on the topic of educational question No. 2 answers of students (cadets) to control questions summing up the results of working out question No. 2 Question No. 3. Medical examinations. control questions on the topic of educational question No. 3 answers of students (cadets) to control questions summing up the results of working out question No. 3 Question No. 4. Organization of medical examination of certain groups of the adult population of the Russian Federation. control questions on the topic of educational question No. 4 answers of students (cadets) to control questions summing up the results of working out question No. 4 Question No. 5. Organization and content of the first and second stages of medical examination. Evaluation of the results of medical examination. control questions on the topic of educational question No. 5 answers of students (cadets) to control questions summing up the results of working out question No. 5 Question No. 6. What is remote blood pressure monitoring? Question No. 7. Advantages of remote blood pressure monitoring. Question No. 8. The procedure for organizing remote blood pressure monitoring. control questions on the topic of educational question No. 6 answers of students (cadets) to control questions summing up the results of working out question No. 6	
4	**The final part:** 1. Conclusion: 2. Assignment for independent work. 2. Answers to students' questions.	15

Literature:

A. Main.

1. Organization of medical care in the Russian Federation: textbook / edited by V.A. Reshetnikova. – M.: LLC "Publishing House "IA", 2018. pp. 37– 54.

2. Federal Law No. 323-FZ dated 21.11.2011 "On the basics of public health protection in the Russian Federation" [Electronic resource. access from help. - legal system "Consultant plus".

3. Order of the Ministry of Health of the Russian Federation of 27.04.2021 N 404n (ed. 01.02.2022) "On approval of the procedure for preventive medical examination and medical examination of certain groups of the adult population".

4. Order of the Ministry of Health of the Russian Federation dated 15.03.2022 N 168n "On approval of the procedure for conducting regular medical supervision of adults" [Electronic resource] access from the reference. - legal system "Consultant plus".

5. Order of the Ministry of Health and Social Development of Russia dated 23.03.2012 N 252n "On approval of the Procedure for assigning to a paramedic, midwife by the head of a medical organization when organizing the provision of primary health care and emergency medical care of certain functions of the attending physician for the direct provision of medical care to the patient during the period of observation and treatment, including the appointment and use of medicines, including narcotic drugs and psychotropic drugs".

6. Resolution of the Government of the Russian Federation No. 2469 dated 28.12.2022 "On the implementation of a pilot project for remote monitoring of the patient's health using the information system (platform) "Personal Medical Assistants".

B. Additional.

7. The Constitution of the Russian Federation (adopted by popular vote on 01.07.2021).

8. Medik V.A., Yuryev V.K. Public health and healthcare: textbook. – 3rd ed., ispr. and add. - M.: GEOTAR-Media, 2016. - 608 p.

9. Health and public health/ Textbook edited by Prof. G.N. Tsarik M.: GEOTAR-Media, 2018. - 910 p.

10. Passport of the national project "Healthcare" (approved by the Presidium of the Presidential Council for Strategic Development and National Projects, Protocol No. 16 dated 24.12.2018) [Electronic resource]. Access from the reference-legal system "Consultant Plus".

Teacher E. V. Khugaeva

"_____" _____ 20___

APPENDIX K

(reference)

St. Petersburg State University

WORK PROGRAM
ACADEMIC DISCIPLINE

Nursing in Primary Care Sistem

Language(s) of instruction
RUSSIAN

Labor intensity (limits of labor intensity) in credit units: 3

Work program registration number: 072912

Saint-Petersburg
2023

Section 1 . Characteristics of training sessions

1.1. Goals and objectives of the training sessions

Purpose: to familiarize students with the peculiarities of the organization of primary health care and the role of a nurse in providing this type of care.

Tasks:

1. To ensure the assimilation of the basic concepts and knowledge about the participation of a nurse in primary health care necessary in future professional activities.

2. To form an idea of the use of legal norms, ethical and deontological principles in the work of a nurse in the provision of primary health care.

3. Get acquainted with the structure of healthcare institutions providing primary health care.

4. To master the nursing aspects of primary health care for various diseases.

5. To get acquainted with the procedure for the application of regulatory and legal documentation on the organization of primary health care.

1.2. Requirements for the student's readiness to master the content of training sessions (prerequisites)

A student studying this discipline must have competencies corresponding to secondary general education. Simultaneously with the study of the discipline he must have knowledge, abilities, skills and competencies in the disciplines: "Healthy man and his environment", "Human anatomy and physiology", "Basics of Latin language and medical terminology", "Medical psychology", "Basics of pathology", "Pharmacology", "Basics of economics", "Information technologies in professional activity", "Life safety", "Human hygiene and ecology".

1.3. List of learning outcomes

The discipline participates in the formation of the competencies of students according to the educational program established by the curriculum for this discipline. Together with other disciplines participates in the formation of the following competencies:

Category of general professional competencies	**Code and name of the general professional competence**	**Planned learning outcomes that ensure the formation of competence**	**Indicator code and universal competence achievement indicator**	**Control and measuring materials (CMM) (test questions, control tasks, cases, etc.)**
1	2	3	4	5
Medical technologies, equipment and special means of prevention	GPC-4 - capable of using medical technologies, medical devices, medicines, disinfectants and their combinations in solving professional tasks;	**Know:** the algorithm of application and evaluation of the results of use of medical technologies, medical devices, medicines, disinfectants and their combinations in solving professional tasks; **Be able to:** apply medical technologies, medical devices, medicinal preparations, disinfectants and their combinations when solving professional tasks **Perform/have practical experience:** use of medical technologies, medical devices, medicines, disinfectants and their combinations in solving professional tasks.	GPC-4.1 Possesses an algorithm for applying medical technologies, medical products, medicines preparations, disinfectants and their combinations when solving professional tasks; GPC-4.2 Know the technical characteristics and rules of use of medical instruments; GPC-4.3 Possesses the skills of examining a patient using medical instruments and interpreting the results obtained.	Practice diary, practice report, characteristics, certification sheet

Preventive measures	GPC-8 - Able to identify priority problems and risks to the health of the patient (population), develop and implement preventive measures to improve health and prevent diseases of the patient (population)	**Know:** the main indicators of public health; **Be able** to: identify priority problems and risks of public health; conduct recreational activities among various categories of the population. **Perform/have practical experience in:** forming a healthy lifestyle in patients and their family members, contributing to the prevention of diseases and health promotion; analyze the health status of the population according to the main criteria.	GPC-8.1 Be able to analyze the health status of the population according to the main indicators GPC-8.2 Be able to identify the priority problems and health risks of the patient GPC-8.3 Carrying out preventive measures to improve the level of health and prevent diseases of the patient (population).	Assignment from the RPA assessment register; - theoretical questions involving the search, generalization and analysis of practice; - practical tasks (cases).
	PEP-2 Able to provide nursing care and other nursing manipulations provided for during medical rehabilitation and spa treatment and participation in the development and implementation of specialized rehabilitation programs;	**Know:** The principles of nursing care and the list of nursing manipulations, provided for during medical rehabilitation and sanatorium treatment **Be able to:** participate in the organization of nursing care and other nursing manipulations when conducting medical rehabilitation and spa treatment, taking into account socio-professional and age-gender structure of the population **Perform/have practical experience:** Skills in organizing nursing care and other nursing manipulations when conducting medical rehabilitation and spa treatment, taking into account socio-professional and age-gender structure of the population.	PEP-2.1. Has the skills of conducting nursing care and a list of nursing manipulations, provided for during medical rehabilitation and sanatorium treatment PEP-2.2. Participates in the organization of nursing care and other nursing manipulations during medical rehabilitation and spa treatment, taking into account socio-professional and age-gender structure of the population. PEP-2.3. Carries out the organization of nursing care and other nursing manipulations when conducting medical rehabilitation and spa treatment, taking into account socio-professional and age-gender structure of the population.	

Development and implementation of projects	UC-2 Able to determine the range of tasks within the set goal and choose the best ways to solve them, based on existing legal norms, available resources and limitations;	**Know:** legal norms of professional activity **Be able to:** choose the optimal ways to solve them. **Perform /have practical experience:** determine the range of tasks within the set goal and choose the best ways to solve them to achieve the intended results;	UC- 2.1 Be able to determine the range of tasks within the set goal and choose optimal ways to solve them, based on the current legal norms, available resources and limitations; UC 2.2. Be able to analyze Alternative solutions to achieve the intended results; develop a plan, define target stages and main directions of work.	Testing, interview on situational tasks and control issues.

1.4. List of active and interactive forms of training sessions

In the process of teaching this discipline, both classical teaching methods (lectures and practical classes) and various types of independent work of students on the assignment of the teacher are used, which are aimed at the development of creative qualities of students, their research skills and encouragement of intellectual initiatives.

To improve the quality of mastering the discipline, the following forms of work are used:

- an active form of classroom study work in the form of seminars;
- an active form of independent work of students, consisting in the use of mandatory and recommended educational literature, as well as writing an abstract on the discipline;
- interactive forms of classroom work:

- presentations based on modern multimedia tools;

- discussions;

- educational role-playing games: "The work of the chief nurse (brother) in the city polyclinic", "The work of the chief nurse (brother) in the women's clinic", "The work of the chief nurse (brother) in the nursing home",

- interactive forms of independent work: creative classes, working with video materials, searching for information in libraries and the Internet.

The volume of active and interactive forms of training is at least 30% of the classroom work.

Section 2. Organization, structure and content of training sessions

2.1. Organization of training sessions

2.1.1. Basic course

Labor intensity, the volume of academic work and the fullness of groups of students																		
training period (module)	Contact work of students with the teacher												Independent work					
	lectures	seminars	consultations	practical exercises	laboratory work	control papers	colloquiums	current control	interim certification	final certification	under the guidance of a teacher	in the presence of a teacher	self-study, including with the use of methodological materials	current control (self-study)	intermediate certification (self-study)	final certification (self-study)	The volume of active and interactive forms of training sessions	Labor intensity
THE MAIN TRAJECTORY																		
full-time education																		
Semester 7	24	0	2	18	0	0	0	0	2	0	0	0	62	0	0	0	20	3
	2-25		*2-25*	*2-25*					*2-25*				*2-62*					
TOTAL:	24	0	2	18	0	0	0	0	2	0	0	0	26	0	0	0		

Forms of ongoing monitoring of academic performance, types of intermediate and final certification			
Training period (module)	forms of ongoing monitoring of academic performance	Types of intermediate certification	Types of final certification
THE MAIN TRAJECTORY			
full-time education			
Semester 3	-	exam	-

2.2. Structure and content of training sessions

Basic course **The main trajectory** **Full-time education**

Study period (module): **Semester 7**

No. i/o	Name of the topic (section, part)	Type of training sessions	Number of hours
1	**Module 1.** Organization of primary health care for the adult population.	lectures	6
		practical exercises	2
		self-study according to methodical materials	4
2	**Module 2.** Organization of prevention of infectious diseases of the adult population in the system of public health protection.	lectures	6
		practical exercises	4
		self-study according to methodical materials	4
3	**Module 3.** Organization of preventive medical examination and medical examination of the adult population.	lectures	4
		practical exercises	4
		self-study according to methodical materials	4
4	**Module 4.** Implementation of medical rehabilitation in medical organizations providing medical care in outpatient settings.	lectures	4
		practical exercises	4
		self-study according to methodical materials	6
5	**Module 5.** Carrying out the examination of temporary disability.	lectures	4
		practical exercises	4
		self-study according to methodical materials	8
6	Consultations	consultations	2
7	Interim certification	credit	2

Section 3. Provision of training sessions

3.1. Methodological support

3.1.1. Methodological guidelines for the development of the discipline

In the educational process such interactive forms of classes are used as: discussions, modeling and case studies, solving situational problems. They are given 20 hours.

Lecture classes provide students with a basic set of knowledge about population health indicators, health care organization and management, quality control and safety of health care activities necessary for effective understanding of the role of the head nurse/brother in the health care system of the population,

Practical classes are designed for in-depth study of the discipline. They allow students under the guidance of the teacher to expand and detail the knowledge gained, to develop and consolidate the skills of application of organizational, managerial and regulatory documentation in their professional activities.

Preparation for practical classes is not limited to listening to lectures, but involves preliminary independent work of students, built in accordance with the methodological recommendations of the teacher.

During the practical training, students should take an active part in the discussion of educational issues: make reports, abstracts, reviews of scientific articles, individual publications of periodicals, relating to the content of the topic of the practical training.

Practical classes, including interactive ones, form students':

- ability to work with regulatory, accounting and reporting and medical documentation;

- public speaking skills, discussion skills, the ability to conduct business negotiations and manage and interact with members of a professional group and voluntary assistants in a professional environment;

- teamwork skills, leadership and performance qualities;

- motivation for professional and personal growth, interest in the profession and the need for continuous professional development;

- ability to organize and provide nursing care;

- advise on health promotion in primary health care institutions, organize and conduct preventive conversations.

Independent work in preparation for practical classes forms systematic thinking, diligence and strong-willed qualities, increases cognitive interest.

The recommended literature should be available in the university library or on electronic media.

Classes in the discipline are conducted using the equipment of the "Simulation Center" on the basis of the resource educational center of high Medical Technologies "Center for Medical Accreditations" of the St. Petersburg State University Science Park.

3.1.2. Methodological support of independent work

When starting to study a new academic discipline, students should familiarize themselves with the curriculum, academic, scientific and methodological literature available in the library of SPbSU, get in the library recommended textbooks and teaching aids, start a new notebook for lecture notes and work with primary sources.

An approximate list of tasks for independent work:

1. Study the materials of the relevant chapter of the textbook, the recommended literature.

2. Solve the reference task.

3. Answer control questions and test tasks on the topic of the lesson.

When preparing for the exam, it is necessary to use lecture notes, workbook and literature recommended by the teacher. If necessary, seek advice and methodological assistance from the instructor.

Approximate topics of abstract papers:

1. Prevention of oncological diseases. Early detection of oncopathology in people of working age.

2. Risk factors for the development of arterial hypertension. Preventive measures among the people of working age.

3. Organization of remote blood pressure monitoring at the attached site.

4. Prevention of unwanted pregnancy among adolescents aged 14-16 years.

3.1.3. Methods of current control of progress and interim certification and evaluation criteria

The main documents regulating the procedure for organizing and conducting current progress control and interim attestation of students at the Faculty of Medicine are: Statute of SPbSU, Rules of study of the main educational program at SPbSU, Rules of study of the main educational program at SPbSU Medical College.

To obtain certification, it is necessary:

- attendance at classes, satisfactory results of interim certification: test knowledge control, oral answers to the teacher's questions on the topic of the class;

- when preparing for the exam, repeat the material passed in strict accordance with the curriculum, an approximate list of educational questions submitted for the exam and contained in this program. Use lecture notes, workbook and literature recommended by the teacher. Pay special attention to the topics of training sessions missed by students for various reasons. If necessary, seek advice and methodological assistance from the instructor.

At the first lesson, the teacher informs the students about the schedule (terms) of the current control of their independent work and the criteria for assessing knowledge during the current control of academic performance, as well as the terms and conditions of the final (intermediate) certification.

The implementation of continuous knowledge control according to the schedule is carried out by the teacher at the expense of the hours provided for by the norms of time for checking various kinds of written works, etc.

The teacher has the right to change the structure and number of topics of the discipline, depending on changes in the regulatory framework. However, it is necessary to ensure that the costs of study time for independent work of students correspond to the established norms of time spent on these types of control, as well as the budget of time provided by the curriculum for this discipline.

Indicators characterizing the current academic work of students are:

1) the activity of attending classes and working in the classroom;

2) evaluation of written assignments (written papers, control papers).

A mandatory requirement for an objective assessment of the level of knowledge and participation of students in training activities, which are provided by the working program of the discipline is attendance of training sessions in the amount of 75% of the total number of classes.

The evaluation criteria are formed on the basis of these indicators of the work of students, and methods of measuring knowledge, which are used in the control of mastering the educational material of the discipline of students, taking into account the weighting coefficients of importance of indicators (in percent). A combination of the following criteria was selected for the discipline "Nursing in the primary health care system for the population":

– results of current work in practical classes - 60%;
– evaluation of the final test tasks for each topic - 20%;
– assessment of tasks for independent work - 20%.

The form of intermediate certification in the discipline "Nursing in the system of primary health care to the population" - an oral answer to 2 (two) questions on the theoretical material of the discipline from the list given below in paragraph 3.1.4, and a practical task, with preliminary written preparation.

At least 30 minutes are allocated to prepare for an oral answer after the student selects a ticket. At the intermediate certification, it is allowed to use a pen or a pencil and a blank sheet of paper.

Control measures for the current control of knowledge (academic performance) of students are carried out during the hours allotted for the study of the discipline. Successful passing of the exam presupposes correct answers to questions orally with preliminary written preparation, based on the studied material and recommended literature. The terms of the interimcertification are determined by the schedule of the educational process of the curriculum and approved by the order of the Rector or a person authorized by him.

When evaluating the student's answer, the teacher is recommended to use the following conditions for grading:

ECTS assessment - A: A sufficiently complete, detailed answer to a question or a practical task is given. The answers may require explanations and clarifications of the above (in the case of an oral test). The answer reflects sufficient knowledge of the lecture material and the main literature. It is presented in literary language, the ability to operate with modern terminology is shown. The ability to illustrate theoretical positions with examples is demonstrated. The answer reflects an understanding of the essence of the disclosed concepts, and their connections to the extent necessary for the development of subsequent disciplines, passing the final certification and upcoming practical activities in the specialty.

ECTS assessment - B: A sufficiently complete, detailed answer to a question or a practical task is given. The answers may require explanations and clarifications of the above (in the case of an oral test). The answer reflects sufficient knowledge of the lecture material and the main literature. It is presented in literary language, the ability to operate with modern terminology is shown. The ability to illustrate theoretical positions with examples is demonstrated. There are minor errors in the use of terminology, in the definition of concepts, minor violations of the logic of presentation.

ECTS assessment - C: A fairly complete answer to a question or a practical task is given. The answer reflects sufficient knowledge of the lecture material and the main literature. It is presented in literary language, the ability to operate with modern terminology is shown. The ability to illustrate theoretical positions with examples is demonstrated. There are errors in the use of terminology, in the definition of concepts, violations of the logic of presentation. Some points may be insufficiently argued and evidenced.

ECTS assessment - D: An insufficiently complete answer to a question or a practical task is given. The answer does not fully reflect the understanding of the essence of the disclosed concepts, and their connections to the extent necessary for the development of subsequent disciplines and upcoming practical activities in the specialty.

The student finds it difficult to illustrate theoretical positions with examples, cannot answer additional questions, makes logical mistakes when trying to argue what has been said.

ECTS assessment - E: A very brief, abstract answer to a question or a practical task is given, the student demonstrates difficulties in understanding the essence of the disclosed concepts and their connections, finds it difficult to illustrate theoretical positions with examples, makes mistakes when answering additional questions, is able to argue.

The "unsatisfactory" (ECTS assesment - F) is given if:

The answer is scattered knowledge with significant errors on the question. There is fragmentary, illogical presentation. There is no response to requests to clarify, explain what has been stated (in the oral form of the test). There are no conclusions, concretization and evidence-based presentation. The student cannot establish the connection of the discussed issue with other objects of the discipline. In general, the lack of understanding of the essence of the disclosed concepts, phenomena, and their connections is demonstrated. The answer reflects ignorance of the lecture material and the main literature. There are significant violations of the norms of the literary language, terminology is used incorrectly.

Assessment scale (in accordance with the Regulation on the Assessment System in accordance with the requirements of the European Credit Transfer and Accumulation System (ECTS))

Total percentage of completion, %	SPbSU assessment for credit	ECTS assessment	SPbSU assessment for exam
90-100	credited	A	excellent
80-89	credited	B	good
70-79	credited	C	good
61-69	credited	D	satisfactory
50-60	credited	E	satisfactory
less than 50	not credited	F	unsatisfactory

3.1.4. Methodological materials for the current control of progress and interim certification (control and measurement materials, assessment tools).

Approximate list of control questions for current control and interim certification:

1. Primary health care. Definition. The importance of PHC in the healthcare system.

2. Organizational and structural scheme of the city polyclinic for adults.

3. List and briefly characterize, according to the nomenclature of medical organizations, therapeutic and preventive medical organizations providing primary health care.

4. Classification of primary health care by forms and conditions of its provision.

5. Precinct principle of PHC organization. Types and numbers of sites. The role of a nurse at the sites.

6. Which sites should be opened in settlements depending on the size of the attached population.

7. What health groups and dispensary groups of citizens do you know? What criteria are used for their formation?

8. Preventive medical examination and regular medical examination of certain groups of the population. Objectives and procedures for their conduct.

9. Procedure for organizing remote monitoring of blood pressure in outpatient settings.

10. Advise the patient where to go and what documents to collect to establish a disability group.

An approximate list of practical tasks for the exam:

Task 1.

Schematically depict how primary health care for adults is organized in the Russian Federation.

Task 2.

Schematically depict the organizational structure of the polyclinic (women's consultation, nursing home).

Task 3.

Make a plan for conducting a group prevention talk with patients with risk factors for cardiovascular disease.

Task 4.

Plan a teaching session on remote blood pressure monitoring for patients.

3.2. Personnel support (human resources)

3.2.1. Education and (or) qualifications of teachers and other persons authorized to conduct training sessions

Classes on the discipline "Nursing in the system of primary medical and sanitary care of the population" can be conducted by teachers who have a degree of candidate or doctor of medical sciences or PhD. In some cases, classes in this discipline can be conducted by a teacher who does not have a degree, but has a higher education in medicine, extensive experience in research and scientific and methodological activities and systematically improving his qualifications. A teacher in this discipline must have experience in scientific and/or practical activities in the field of medicine.

3.3. Material and technical support

3.3.1. Characteristics of classrooms (premises, places) for conducting classes

When studying the discipline, the sanitary and hygienic norms of placing students in classrooms and the requirements stipulated by the educational standard of implementation of higher professional education programs of St. Petersburg State University are taken into account. Classrooms should have the necessary illumination; ventilation of the room is provided.

For individual classes (at the request of the teacher) it is required to allocate a room for interactive lectures, equipped with a computer with a multimedia projector and acoustic system, wall screen.

3.3.2. Characteristics of classroom equipment, including non-specialized computer equipment and general-use software

For the lecture audience – a multimedia projector, a screen (portable or stationary), a laptop with multimedia capabilities, a network filter, a chair, a lecturer's desk, a table for placing demonstration equipment.

The class must be equipped with:

A computer of at least Pentium IV class, RAM of at least 1 GB, WinXP OS or higher, a DVD-ROM, a USB interface and a set of programs for working with photo and video images, as well as sound speakers and a network filter. Monitor with a diagonal of 17 or 19 inches with a resolution of 1280 x 1024 pixels, high brightness, maximum resolution for optimal image quality.

3.3.3. Characteristics of specialized equipment.

Equipment of the "Simulation Center" on the basis of the resource educational Center of High Medical Technologies "Center for Medical Accreditations" of the St. Petersburg State University Science Park

3.3.4. Characteristics of specialized software

Specialized software is not used in this course.

3.4. Information support

3.4.1. List of mandatory literature

1. Medik V.A. Public health and healthcare: textbook for students of medical universities, colleges and colleges / V. A. Medik, V. K. Yuriev. - M.: Geotar - Media, 2020. - 224 p.

2. Medik V. A. Public health and healthcare: practicum/ V.I. Lisitsin, A.V. Prokhorova: Geotar - Media, 2021. - 144 p.

3.4.2. List of additional literature

1. Public health and healthcare: textbook for students of medical universities / L.A. Alekseeva [et al.]; Edited by V.A. Minyaeva, N.I. Vishnyakova. - 6th ed. - Moscow: MEDpress-inform, 2021. - 656 p.

3.4.3. List of other information sources

1. Information and legal portal "ConsultantPlus" URL: http://base.consultant.ru (accessed: 28.02.2022).

2. Medical portal Medicine From A to Z URL: http://медпортал.com/organizatsiya-sistemyi-zdravoohraneniya.html ; (accessed: 28.02.2022).

3. Federal State Statistics Service URL: http://www.gks.ru (accessed: 28.02.2022).

4. Kirov GMA Student Community URL: http://vmede.org/index.php (accessed: 28.02.2022).

5. Russian National Library (RNB), St. Petersburg URL: www.nlr.ru (accessed: 28.02.2022).

6. University Information System RUSSIA URL: www.cir.ru/index .jsp (accessed: 28.02.2022).

7. Electronic library system of educational publications URL: http://www.iqlib.ru (accessed: 28.02.2022).

Scientific Electronic Library URL: www.elibrary.ru (accessed: 28.02.2022).

Section 4. Program developers

Last name, first name, patronymic	Academic degree	Academic title	Position	Contact information (official email address, official phone number)
Fedotkina Svetlana Alexandrovna	Doctor of medical sciences (MD)	docent	Teacher of the medical college	st003079@mail.spbu.ru Tel.: 328-94-04

APPENDIX L

(advisory)

Proposal to the Russian Society of Cardiology on amendments to clinical guidelines

Substantiation.

Remote blood pressure monitoring is the process of transmission tonometer data via telecommunication lines for the purpose of remote interpretation using a software product of structural and functional technology of medical care organization with the use of remote blood pressure monitoring in patients, taking into account the redistribution of functional responsibilities of medical professionals. It is aimed at: maintaining target blood pressure levels, monitoring the implementation of medical recommendations for the correction of risk factors, monitoring compliance with the antihypertensive therapy regimen, assessing the condition of target organs.

Remote blood pressure monitoring replaces frequent visits to the physician to assess the tolerability, efficiency and safety of treatment and provides remote monitoring of compliance with medical recommendations. Its use helps to increase the patient's conscious participation in the therapeutic and preventive process, which in turn leads to the efficiency of treatment.

Recommended:

- as part of preventive prophylaxis - all patients with high normal BP (130 - 139/85 - 89 mmHg);

- all patients with arterial hypertension within the framework of regular medical monitoring;

- young patients with isolated systolic arterial hypertension: increase in SBP >= 140 mmHg with DBP < 90 mmHg, since many of them may develop persistent arterial hypertension in the future;

- patients with high normal blood pressure or "white coat" arterial hypertension and at high risk of developing resistant arterial hypertension.

Gives the opportunity to:

- replace routine visits at 3–4-week intervals to monitor target BP levels (if there are no other reasons for more frequent visits);

- achieve target blood pressure within 3 months;

- all patients with arterial hypertension taking antihypertensive therapy, if it is insufficiently effective, replace the previously prescribed antihypertensive drug or join another drug;

- target blood pressure levels are the recommended levels to be achieved in each subgroup of patients, but the most important principle in achieving them is to maintain patient safety and quality of life. Therefore, the rate of reaching target values and the degree of blood pressure reduction can be adjusted in a particular patient depending on the specific clinical situation.

Remote blood pressure monitoring in the stable course of arterial hypertension may become an acceptable alternative to visits to a medical organization.

APPENDIX M
(advisory)

Draft order
on the organization of the post of independent reception of patients
by nurses at the day inpatient facility (hospital)
GOVERNMENT OF SAINT PETERSBURG
ADMINISTRATION OF THE FRUNZENSKY DISTRICT OF ST. PETERSBURG
St. Petersburg State Budgetary Healthcare Institution
"City Polyclinic No. XXX"

ORDER

_____ _____

On the organization of medical care with hypertension independent reception of patients by nurses for

remote blood pressure monitoring

In order to organize the post of independent reception of patients by day hospital nurses, to improve the availability and quality of medical care to the attached population

I ORDER:

1. Head of polyclinic departments:

organize the work of a nurse for remote blood pressure monitoring;

organize control over the work of independent reception of the nurse in accordance with the approved Rules and Criteria (Appendix 1, 2)

2. Chief nurse, senior nurses:

to ensure the implementation of the attached Rules in the organization of independent work of nurses for remote blood pressure monitoring;

to familiarize the nurses of the cardiology office with the order;

use the developed Criteria for evaluating the quality of work.

3. Head of the Cardiology Department:

to provide an assessment of the quality of independent management of patients by nurses in accordance with the evaluation criteria.

4. I shall entrust control over the execution of the order to the Deputy Chief Medical Officer.

Chief Physician Full name

Continuation of Appendix M
Appendix 1 to the Order of the Chief Physician

Rules for internal quality control of medical care for patients with arterial hypertension by a nurse of a cardiologist's office for self-monitoring of blood pressure

1. Duties of a nurse who performs an independent appointment in a cardiology office:

- issuance of the registrar, if necessary, filling in the patient's personal account;
- patient training, issuance of an information memo;
- filling in the necessary paper documentation, entering information into the electronic system for setting up a patient for monitoring and receiving and transferring devices;
- conducting a telephone survey, remote indicators monitoring, filling out the necessary documentation for medical observation programs (depending on the program);
- response in case of destabilization of the patient's condition: a call to the patient's personal phone number or to the phone number of close relatives or other legal representatives of the patient, an appointment of the patient for a medical consultation using telemedicine technologies, a call for emergency medical services (EMS) in case if situation requires urgent intervention;
- conducting regular medical monitoring of the health of patients;
- evaluation of the efficiency of the use of medicinal and non-medicinal methods of treatment.

2. Quality control of independent admission of patients by a nurse is carried out according to the following criteria:

- control of the volume and quality of medical care provided by analyzing the data of the information system;
- assessment of the qualification of a nurse performing an independent appointment;
- determination of the causes of errors in the provision of medical care;
- questioning of patients based on the results of medical care received.

3. Accounting for the results of internal control of self-admission of patients by a nurse includes:

- drawing up an act based on the results of internal control;

- analysis of the results obtained;

–- analysis of patient survey data.

4. Internal control of self-admission of patients by a nurse is carried out monthly by a senior nurse in accordance with the criteria for assessing the quality of work (Appendix 2);

- submission of a report to the head of the cardiology department;

- taking measures to prevent identified comments.

5. The result of internal control shall be recorded in the log of assessment of the quality of medical care provision by nurses at self-admission;

6. The results of the internal audit are discussed as part of the training sessions for advanced training of secondary medical personnel.

Continuation of Appendix M
Appendix 2 to the Order of the Chief Physician

Criteria for evaluation of independent admission of cardiology room nurses

Full name of the nurse

Patient's electronic card number

No.	Quality criteria	Yes/no
1.	Dynamics of the patient's health status	Yes/no
2.	Conducting patient instruction	Yes/no
3.	Preventive conversations	Yes/no
4.	Making a decision about referral to a physician	Yes/no
5.	Total score	Yes/no
6.	Dynamics of the patient's health status	Yes/no

1. Recording in the medical documentation of the dynamics of the patient's health status – 1 point.

2. Availability of preventive conversations within the framework of health schools – 1 point.

3. Correctness of decision making on planned or emergency referral to a physician - 1 point.

APPENDIX N

(informational)

Dear colleague!

We ask you to take part in an anonymous sociological study on the quality of medical care to the population. The information obtained in the course of the study will serve as a basis for making recommendations to improve the provision of medical care in outpatient settings.

Before answering the question, read it carefully. Pay attention to the explanations to the question in parentheses, if there are any. Choose and tick the answer(s) that corresponds to your opinion. If you are not satisfied with the proposed options, write your own answer.

We hope that you will answer our questions, and thank you in advance!

1. Age_____ (full years):

2. Education:

1	higher
2	specialized secondary

3. What is your position?

1	chief
2	physician
3	nurse

4. What is your qualification category?

1	I don't have a category
2	1st category
3	2nd category
4	highest category

5. Please indicate what does not satisfy you in your medical organization?

Question criteria		**Answer option**				
		Yes, satisfied	**Rather satisfied than not satisfied**	**No, not satisfied**	**Rather not satisfied than satisfied**	**I find it difficult to answer**
1	Medical equipment					
2	Registrar's office					
3	Diagnostic service					
4	Management					
5	Sanitary conditions					
6	Psychological climate in the team					
7	Qualification level of your colleagues					
8	Organization of the treatment process					
9	Attitude of patients and their relatives					

6. Are you satisfied with your work?

1	No
2	Yes

7. What do you think can contribute to improving the quality and efficiency of the work of medical personnel in your medical organization?

1	teaching psychology of communication with patients
2	improvement of professional knowledge and skills
3	rational distribution of working time
4	equipping the workplace in accordance with the standard staffing
5	differentiated remuneration

8. Specify the reasons for satisfaction

Question criteria		**Answer option**				
		Yes, satisfied	**Rather satisfied than not satisfied**	**No, not satisfied**	**Rather not satisfied than satisfied**	**I find it difficult to answer**
1	Mutual understanding with colleagues					
2	Mutual understanding with management					
3	Conflict situations with patients					
4	Work load					
5	Remuneration of labor					
6	The possibility of learning and self-improvement while working					

9. Specify the reasons for dissatisfaction

Question criteria		**Answer option**				
		Yes, satisfied	**Rather satisfied than not satisfied**	**No, not satisfied**	**Rather not satisfied than satisfied**	**I find it difficult to answer**
1	Mutual understanding with colleagues					
	Mutual understanding with management					
2	Conflict situations with patients					
3	Work load					
4	Remuneration of labor					
5	The possibility of learning and self-improvement while working					

10. Do you think you have sufficient knowledge of the following issues:

Question criteria		Answer option				
		Yes, enough	Rather yes than no	No, not enough	Rather no than yes	I find it difficult to answer
1	biomedical ethics					
2	patient rights					
3	duties of medical personnel					
4	health care provider's responsibility in case of violation of patient's rights					
5	responsibility of a medical professional in case of harm to the patient's health					
6	social and legal protection of health professionals					

11. Would you like to learn more about the social and legal protection of health professionals?

1	Yes, I know practically nothing about it
2	Yes, I would like to expand my existing knowledge on these issues
3	No, I'm not interested
4	I find it difficult to answer

12. How does the management motivate you to provide proper quality medical care?

	does not motivate
	declaration of gratitude
	informing about achievements at public events
	accrual of a cash bonus

13. Do you find it useful to provide brief preventive counseling to patients during the medical examination and at the reception?

1	no
2	yes
3	I find it difficult to answer

14. Do you think the use of remote blood pressure monitoring will make your work easier?

1	no
2	yes
3	I find it difficult to answer