NJSC « MARAT OSPANOV WEST KAZAKHSTAN MEDICAL UNIVERSITY»

**ABSTRACT
TO THE PhD DISSERTATION**

Topic name: The effectiveness of the rehabilitation program jf patients with myocardial infarction at the of primary care level
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Relevance. Cardiovascular diseases (CVDs) are the leading cause of death worldwide and a major obstacle to sustainable human development [1]. According to WHO, 17.9 million people died from cardiovascular diseases in 2016, accounting for 31% of all deaths worldwide. Of these deaths, 85% are caused by heart attack and stroke. Coronary heart disease (CHD) continues to be a significant contributor to health loss in all regions of the world [2, 3], but mortality rates from CHD vary more than 20-fold between countries [4]. Of the 17 million premature deaths from noncommunicable diseases in 2015, 82% occurred in low- and middle-income countries, and 37% were caused by CVDs. Age-standardized death rates from CHD per 100,000 people per capita per year were much higher in Kazakhstan (97) than in the USA (60), Brazil (54) and the UK (46), with much smaller differences in other causes of death [5].

According to Kazakh authors, mortality from CVD in Kazakhstan is even higher and amounted to 219.0 per 100,000 in 2015, among which IHD and CVD accounted for 47.7% and 36.4%, respectively. [6,7,8]. The primary incidence rate for CVD in Kazakhstan from 2010 to 2014 increased by almost 15% (from 2086.7 per 100 thousand population to 2394.7). Over the same years, in Kazakhstan there has been an increase in the incidence of myocardial infarction (MI), the mortality rate of which reaches 30-50%. The mortality rate from myocardial infarction according to WHO data is 55.7% in Kazakhstan. , in Russia - 44%, in the USA - 42.2% [9].

Rehabilitation of patients with cardiac disease in primary care is the most important evidence-based intervention to reduce the risk of readmission and all-cause mortality after MI [10]. It is known that cardiac rehabilitation (CR) in patients with coronary artery disease, in addition to reducing mortality and subsequent hospitalizations, improves the course of the disease, increases exercise tolerance and quality of life [11]. Rehabilitation after an MI includes lifestyle changes, physical training, self-management, and psychosocial activities. Most CVDs can be prevented by addressing behavioral risk factors such as tobacco use, unhealthy diet and obesity, physical inactivity and harmful use of alcohol [12,13]. But despite the proven effectiveness of CR, the coverage of patients with MI by rehabilitation programs remains low. For example, in Western countries, no more than 25-35% of patients participate in the CR program after MI [14,15].

Activities carried out in Kazakhstan for the primary and secondary prevention of CVD have shown that the vast majority of patients with CVD continue to smoke, eat poorly and exercise little, and have poor control of blood lipid levels, which negatively affects the prognosis of their life and health. The clinical protocol for CR in an outpatient setting does not comply with modern evidence-based recommendations; active patient involvement and assistance at home are not provided for. There are not enough doctors from different specialties and multidisciplinary teams required for CR in primary care. However, it is already known that other health care workers, for example, nurses, physician assistants, successfully conduct preventive programs [16]. Trained medical students can teach patients about physical activity, proper nutrition, smoking cessation, support for taking medications, and help the local doctor and cardiologist implement rehabilitation programs, but such studies have not been conducted. In addition, these studies demonstrated the positive impact of nursing staff for secondary prevention in patients with CVD [17]. The purpose of this study was to evaluate the impact of an outpatient rehabilitation program carried out by trained medical students under the guidance of a mentor physician, carried out according to a developed methodology and integrated into the routine algorithm of outpatient care for patients who have suffered a myocardial infarction.

Purpose of the study: To evaluate the effectiveness of the developed rehabilitation program for patients with myocardial infarction in an outpatient setting.

Research objectives:

1. Conduct an epidemiological study on the survival of patients after myocardial infarction in Aktobe for the period 2008-2018

2. Based on international recommendations, develop an outpatient rehabilitation program for patients after myocardial infarction for implementation and subsequent evaluation of its effectiveness

3. Conduct a prospective randomized controlled study of the effectiveness of the developed rehabilitation program in the city of Aktobe in 2 groups of patients with myocardial infarction: included in the developed rehabilitation program and receiving standard care for a year to study the frequency of recurrent myocardial infarction, strokes, overall mortality, re-hospitalizations in specialized hospital, as well as patients' adherence to medical recommendations, lifestyle changes, self-control and self-management skills.

Materials and research methods

For the first task:

The design of this study was a retrospective observational study.

The objects of the study were medical records of patients who suffered a myocardial infarction and were discharged from all hospitals in the city of Aktobe (MC WKSMU named after Marat Ospanov, AMC, ZHDB, emergency hospital) for the period from January 2008 to September 2018. A total of 606 case histories were analyzed. Data from patients with a verified diagnosis of myocardial infarction were copied from medical records and entered into the database.

Information on the Alive/Dead status of patients who suffered Acute myocardial infarction in 2008-2009 (if died, then the date of death) was received from the Aktobe city civil registration department, as of 08/20/2019 to study 10-year survival rate with a list of patients attached. .

592 people had complete data, of whom 397 were men and 195 women. The average age was 61.5 ± 12.2 years. All patients received only drug therapy (without surgery). The obtained data were also entered into the database. For statistical analysis of survival, the Kaplan-Meier method was used to construct a survival curve and life table. Data processing was carried out using SPSS. In addition to overall survival, survival was calculated depending on gender, age, and also depending on the presence of a history of risk factors such as arterial hypertension (by grade), diabetes mellitus, and previous myocardial infarction.

For the second task:

Taking into account limited resources, we decided to use the contextualization method of ready-made international guidelines to create a rehabilitation program (RP) for the rehabilitation of myocardial infarction.

We followed a four-step process to contextualize the CRC:

Phase 1 - Context Analysis. We conducted a retrospective study of the survival of patients after myocardial infarction, a review of clinical protocols for the rehabilitation of patients with CVD of the Ministry of Health of the Republic of Kazakhstan, regulatory documents regulating dispensary observation of chronic patients, the issuance of free medications, outpatient records of patients, and assessed the current practice of care for patients after myocardial infarction in organizations Primary health care for contextual factors, behavioral patterns of the population and patients that influence the effectiveness of rehabilitation in outpatient settings.

Phase 2 - Search and evaluation. The work focused on identifying rehabilitation strategies for post-MI patients. A search was conducted to identify and evaluate existing international CRCs for PHC on outpatient rehabilitation of MI available for reading. We searched the online databases Medline, Guidelines International Network, National Institute for Health and Care Excellence, Scottish Intercollegiate Guidelines Network National Guideline Clearinghouse, using predefined keywords (rehabilitation, myocardial infarction, primary care). The methodological quality of CPGs meeting the inclusion criteria was assessed using AGREE II.

Phase 3 - Contextual Integration. The information obtained at the previous stages was used by the doctoral student and the scientific consultant to discuss the clinical recommendations of the selected CRC, taking into account the applicability and acceptability for the primary health care conditions of Aktobe. The approved recommendations, with their contextual additions, were compiled into a draft text of the RP.

Phase 4 - External review. A preliminary version of the RP was submitted to two external reviewers, expert cardiologists, to obtain their views on the acceptability and applicability of the RP in the local setting. Eligibility criteria included organizational aspects of care, access to

health services, and population and patient characteristics. Questions regarding acceptability focused on the strengths and weaknesses of the CRC, suggestions for modification, impact on current processes, training required, barriers and facilitators, resource utilization, and practicality.

For the third task:

Study design

This study is an open-label randomized controlled trial comparing a designed outpatient MI rehabilitation program (additional to standard care) with standard care in an outpatient setting.

Formulating a research question using the PICO framework:

P – patients with myocardial infarction

I – ongoing rehabilitation program in addition to standard care

C – standard outpatient care

O – death, emergency hospitalization, recurrent MI, stroke, worsening CHF class, SBP, DBP, heart rate, adherence to medication, lipid metabolism indicators, BMI, waist circumference, smoking and the number of cigarettes smoked, tolerance in exercise.

T – study duration 1 year.

Characteristics of research objects (P)

The study included all patients who were in the cardiology department of the Aktobe hospital with a diagnosis of "Acute myocardial infarction", provided they signed informed consent.

Recruitment of participants was carried out on the basis of the Medical Center of Western Kazakhstan Medical University, from whose management consent was obtained for access to medical data and patients.

In the hospital, after receiving the IS, the following procedures were carried out with the patients: collecting information, assessing the patients' condition, and filling out questionnaires by the participants (on quality of life, level of anxiety and depression, and on nutrition). The results of clinical, laboratory and instrumental studies, information about the treatment performed and recommendations were extracted from the patients' medical records.

During the allotted period of time from 04/01/2019 to 03/31/2020, 207 patients were treated in the cardiology department of the Marat Ospanov West Kazakhstan State Medical Center with a diagnosis of Acute myocardial infarction. Of these, 30 people refused to participate in the study, 22 people were not included in the study due to exclusion criteria. Thus, a total of 155 patients participated in our study. Three of them (1.9%) did not complete participation in the study: one refused to participate a month after discharge, two were lost after discharge (they did not contact doctors at the place of residence, they did not make contact). 7 patients (4.5%) died within a year after discharge. 145 patients completed the study.

Patients were randomized using a random number generator into 2 groups: study and control. Randomization was carried out with a 1:1 ratio between the study and control groups.

Inclusion criteria for the study: All patients with acute MI who were discharged from hospitals in Aktobe and agreed to participate in the study.

Exclusion criteria:

• the presence of concomitant pathology that may bias the results of the study: decompensated cardiac, renal, liver failure, malignant neoplasms, cognitive impairment

• accommodation in remote areas of the Aktobe region

• age-related hearing loss

• encephalopathy

• refusal to participate.

Characteristics of the intervention (I)

Participants in the main group, against the background of standard care, received an outpatient rehabilitation program developed on the basis of modern international recommendations, which was carried out by trained medical university students as part of the

volunteer movement and coordinated by clinical teachers, the developers of the program. Trained student volunteers carried out home visits to patients.

Each visit lasted 60 minutes and consisted of 2 parts. The first part is establishing contact, assessing the patient's clinical condition (survey to determine the patient's well-being, complaints, changes since the previous visit), measuring the following parameters: blood pressure, heart rate, weight and waist circumference. Smoking patients were asked about the number of cigarettes they smoked. The presence of comorbid conditions and prescribed therapy were also assessed. The second part is patient education, support, motivation if necessary. For each visit, the second part proposed a theme that the students had to follow.

Visit 1 – training on medications. At this visit, patient-oriented information was provided (using the Calgary-Cambridge method) on the medications required to be taken after myocardial infarction. To increase patients' adherence to drug therapy, questions were clarified, patients' attitude towards medications, in case of patients' reluctance to take drugs, their reasons, and acceptable methods of reminding them to take drugs were discussed with the patient. They also informed patients about the "target values" for blood pressure, heart rate, cholesterol, LDL, etc., involving patients in monitoring treatment.

Visit 2 – physical activity training. At this visit, a 6-minute walk test was initially performed to determine the patient's baseline level of physical activity. Next, an explanation of the test results and its target values, a discussion of the patient's physical activity from the point of view of its impact on the risk of CVD, and the patient's readiness to increase the level of physical activity was clarified. Information was provided about the types of physical activity recommended after myocardial infarction, and the patient himself chose the type of activity acceptable to him. After this, an individual physical activity plan was drawn up for this patient.

Visit 3 – nutrition training. At this visit, the patient's dietary habits were clarified from the point of view of their impact on the risk of CVD, the patient's readiness to change diet was determined, and information about options for new eating behavior was provided. The information was based on the European recommendations for the prevention of cardiovascular diseases in clinical practice (revision 2016). The patient was given a choice of recommendations acceptable to him, after which an individual nutrition plan for this patient was drawn up.

Visit 4 – training on smoking cessation or weight loss, depending on the presence of a risk factor. At this visit, the initial smoking status was assessed (how many cigarettes a day smokes, how many years of smoking) or the patient's initial weight, WC, and body mass index (BMI) was calculated. Next, the patient was informed using motivational interviewing (MI) techniques on smoking cessation/weight loss. An individual smoking cessation/weight loss plan suitable for the patient was drawn up.

Visit 5 and further – support visits, during which compliance with recommendations was checked, repeated MI and repeated training were performed if necessary, changes in the patient's condition were discussed, and questions were answered. If planned repeat PCI or CABG/MCBG was required, it was recommended to obtain a referral from a local GP or cardiologist.

For the first two months, visits were carried out at least once a week, in subsequent months - once every 2-3 weeks. In addition, telephone communication was carried out if necessary at any time.

The coordinating mentor teacher conducted sessions with students, assisted when questions arose, or made visits with students when necessary.

Standard outpatient care (C)

In both groups, patients were provided with standard care in accordance with the clinical protocol of the Ministry of Health of the Republic of Kazakhstan in force in Kazakhstan for the rehabilitation of patients with cardiac diseases, also according to the order for dispensary management of chronic patients at the primary health care stage. "Standard" outpatient care for patients after MI in primary care organizations included registration in the list of patients subject to long-term observation (dispensary registration) for 12 months, prescribing and prescribing the main groups of medications (beta blockers, ACE inhibitors, antiplatelet drugs, diuretics , calcium

channel blockers, statins) with free prescriptions, laboratory and instrumental studies within a certain time frame (after discharge from the hospital, 2,3,6,12 months after ACS) in accordance with order No. 647 of the Ministry of Health of the Republic of Kazakhstan, provision of services within 7 working days (metered walking, dynamic training on a bicycle ergometer, laser therapy , balneotherapy, massage of the cervical-collar area) according to the Protocol of the Republic of Kazakhstan on rehabilitation, a free 10-day course of CR in the rehabilitation center (RC) of the city.

Performance Assessment (O)

The main criteria for effectiveness were: death, emergency hospitalization in a specialized hospital, recurrent myocardial infarction, stroke, worsening CHF class, quality of life using MacNew Heart Disease HRQL.

The following additional effectiveness criteria were used: SBP, DBP, heart rate, the proportion of patients who achieved target blood pressure levels; adherence to taking medications; biochemical blood parameters (total cholesterol, triglycerides, HDL, LDL, proportion of patients achieving LDL target values; body mass index; waist circumference; smoking and number of cigarettes smoked; exercise tolerance using TSH; changes in eating behavior using FFQ; level depression and anxiety and using the HRDS, HADS tests.

Study duration (T)

The total duration of the study was 2 years: patients were recruited from April 1, 2019 to March 31, 2020 (for a year), then the patients were monitored for a year. The results of the intervention were assessed 12 months after the start of the study.

Characteristics of research methods

The Food frequency quetionaire is a dietary assessment tool provided as a questionnaire to assess the frequency and, in some cases, portion size information of food and beverage consumption over the past year. This questionnaire has been validated and adapted for residents of Kazakhstan [18].

Questionnaire for assessing quality of life. The MacNew Heart Disease HRQL questionnaire consists of 27 items, which are divided into three domains (13-item Physical Limitation Domains scale, 14-item Emotional Functioning Domains scale, and 13-item Social Functioning Domains scale). This study used a version of the questionnaire validated for the Russian-speaking population [19].

The Hamilton Rating Scale for Depression is designed to quantify the condition of patients with depressive disorders. It consists of 21 questions [20].

Hospital Anxiety and Depression Scale. The HADS binary scale is divided into 2 subscales: "anxiety" and "depression". When interpreting the results, the total score for each subscale was taken into account. Clinically significant reductions in anxiety and depression were defined as a decrease of at least 3 points on the HDRS, 1.7 points on the HADS, and/or an SMD greater than 0.3 [22–24].

6-minute walk test. The test allows you to assess the level of daily activity of patients, and its results correlate well with indicators of quality of life; they can be used as additional criteria for assessing the effectiveness of treatment and rehabilitation of patients. When assessing the dynamics of the test, the minimum significant improvement is considered to be an increase in distance by 33–41.8 m [25-27].

Statistical research methods

Quantitative continuous variables are presented as arithmetic mean and standard deviation, median with interquartile range depending on assumptions. Categorical variables are presented as absolute numbers and percentages, with 95% CIs calculated. Comparisons between groups for continuous variables were carried out using the Mann-Whitney test (for comparison of independent samples), Wilcoxon test (for paired comparisons), for categorical ones - using the chi-square test and Fisher's exact test for independent samples and the McNimar test for comparisons of paired samples. Effect sizes were calculated for all tests performed. To compare two means, we used Cohen's delta, or Glass's delta if the group had a different standard

deviation, as a measure of effect size. A value of 0.20 indicates a small effect, 0.50 a medium effect, and 0.80 a large effect. The level of statistical significance was fixed at 0.05. Statistical data processing was carried out using application packages Statistica 10 and SAS JMP 11.

Results

Results for the first task

The overall 10-year survival rate of patients after AMI was 38.2%. The mean survival time of patients was 92 months (95%CI 76.3; 107.7).

Using Cox regression analysis, survival was associated with age (hazard ratio (HR) 1.05, 95% CI 1.04–1.06, significance 0.000); history of diabetes mellitus (OR 1.49 95% CI 1.15; 1.94, significance 0.003) and a history of stroke (OR 1.89 95% CI 1.10; 3.25, significance 0.021).

Comparison of survival by sex. Survival rate in women was 30.4%, in men it was 42.0%. The analysis showed that the survival rate of women is lower than that of men (p – 0.007). However, it should be noted that the average age of development of MI in women is 67.22±11.86, and in men only 58.64±11.36.

Comparison of survival by age. Data were grouped into age groups according to WHO recommendations. Age turned out to be a significant indicator, since the significance level was p = 0.000. The older the age group, the lower the survival rate. In the group of young patients - 71.2%; In the group of middle-aged patients – 58%; In the group of elderly patients – 25.7%; In the group of elderly patients – 3.6%. Differences between groups are statistically significant/

Comparison of survival depending on blood pressure level: in patients without hypertension – 57.1%; In patients with grade 1 hypertension – 63.6%; In patients with stage 2 hypertension – 39.2%; In patients with grade 3 hypertension – 36.0%. p - 0.046.

Comparison of survival depending on the presence of diabetes. The percentage of surviving patients with this disease is significantly lower. Survival rate for diabetes is about 25.5%, for people without diabetes – 40.7%.

Comparison of survival depending on history of infarction. In patients with repeated MI – 27.9%, in patients with first MI – 4563%. A patient's history of previous MI was significant (p=0.000), and patients who experienced a first MI survived better.

Comparison of survival depending on the history of stroke. A stroke is a predictor that shows whether the patient has had a stroke in history. The graph shows that the mortality rate of patients who suffered stroke is higher. The significance of the predictor is beyond doubt (p=0.000). In patients with a history of stroke - 12.5%, in patients without stroke - 38.9%.

Thus, the 10-year survival rate after myocardial infarction was 38.7%. Survival was lower in older patients with higher stages of hypertension, recurrent AMI, and concomitant diabetes than in younger patients with lower stages of hypertension, primary AMI, and without diabetes.

Results for the second task

The developed program for outpatient rehabilitation of patients after myocardial infarction is a complex of evidence-based interventions, which the patient, in coordination with the multidisciplinary team (MDT) of the primary health care organization (local doctor, nurses, psychologist, social worker, specialists) applies in the clinic/SVA, at home and/ or at work, continuously throughout life, in order to improve the current condition and prognosis. All patients discharged after hospitalization for acute MI and without severe cognitive impairment are invited to the program. As part of the dissertation research, the doctoral student and trained student volunteers assessed the patient's functional status, prescribed and monitored drug and non-drug interventions, taught patients the skills to modify RF at baseline and at subsequent visits, supported long-term participation in the rehabilitation program, assessed symptoms of anxiety and depression using validated tests, coordinated an individual plan for monitoring and visits. The main interventions were: drug management, physical activity, smoking cessation, weight loss, proper nutrition.

The program is innovative, the intellectual property of the authors, complies with the articles of the Code of the Republic of Kazakhstan "On the health of the people and the healthcare system" dated July 7, 2020 No. 360-VI ZRK., the order of the Ministry of Health of the Republic

of Kazakhstan "On approval of the standard for organizing the provision of medical rehabilitation to the population of the Republic of Kazakhstan" dated December 27 2013 No. 759.

Results for the third task

Cardiovascular outcomes

As observational endpoints (strict criteria for the effectiveness of the intervention), our study used such indicators as death, recurrent MI, stroke, emergency hospitalization in a cardiology hospital and worsening class of CHF.

During observation in both groups, there were 7 (4.6%) deaths, 5 cases of stroke (3.3%), 11 recurrent myocardial infarctions (7.2%) and 12 emergency hospitalizations to the cardiology department for unstable angina (7 .9%) and 7 cases of worsening CHF according to NYHA (4.6%). The frequency of events in the main group was lower than in the control group, a statistically significant difference was detected in terms of emergency hospitalization (RR 0.185 (95%CI 0.04-0.82), p=0.01; NNT 8.9) and progression CHF (OR 0.154 (95%CI 0.02-1.25), p=0.04; NNT 14.3).

Quality of life assessment

Analysis of the quality of life questionnaire results showed different results across the three domains. When assessing the emotional domain before rehabilitation activities, the average scores in the main and control groups were approximately the same (p-0.584); after a year, an increase in the quality of life was observed in both groups. However, when comparing Before/After in the main group, the differences reach statistically significant figures (p-0.000), while in the control group the differences over the observed period of time are not significant (p-0.624. Indicators of the physical domain when comparing Before the intervention/One year after interventions in both groups reached statistically significant differences (p-0.000 and 0.001, respectively). In the social domain, as well as in the emotional domain, there was a positive trend in both groups, however, in the control group, the Before/After differences were not statistically significant (p-0.863).), and in the main group statistically significant differences are observed (p-0.000).

Lifestyle modification (risk factor control)

Nutrition

In terms of alcohol consumption at the beginning of the study (at the time of discharge from the hospital), the main and control groups were comparable (p-0.686). After a lifestyle modification program one year after discharge, a statistically significant difference was noted between the groups (p-0.001). At the beginning of the study, the groups did not differ between the groups in terms of daily calorie intake (p-0.852). And, although in both the main and control groups there was a decrease in daily caloric intake, a year after discharge there was a statistically significant difference between the groups (p-0.000).

A decrease in calorie content was noted due to all the main components of the diet, and in the main group the decrease in nutrient consumption was more pronounced. As a result of repeated sessions with patients on nutrition correction, a statistically significant difference between the groups was revealed in the consumption of carbohydrates and fats, which play a large role in the process of atherogenesis. Taking a closer look at the different types of fats, you will notice that in the control group the decrease in fat intake was insignificant. In the main group, the consumption of saturated fatty acids, in particular cholesterol, was significantly reduced.

The macroelements that are most important in the functioning of the cardiovascular system include K, Mg and Na. As can be seen from Table 9, the decrease in K and Mg in the control group is more pronounced, which is not very good for the functioning of the CVD, while the decrease in Na is more pronounced in the main group (p-0.000). Since excess sodium intake from food causes excess fluid retention in the body, reducing it has a beneficial effect on the functioning of the heart and blood vessels.

If we consider individual product groups, we can also note that at the beginning of the study, the experimental and control groups did not differ in the number of products consumed. When working with patients of the main group, we focused on the main five product groups. We see that a year from the start of the study, the consumption of fish and fish products in the main group increased more than three times, while in the control group there was only a slight increase in the consumption of this group of products. The decrease in consumption of meat and meat products is also more pronounced in the main group (by a third of the original amount). The consumption of nuts and seeds in the main group one year after discharge was six times higher than in the control group. In terms of the consumption of vegetables and fruits as the main sources of fiber, the main group showed a positive trend, while in the control group, on the contrary, there was a decrease in their consumption. As a result, the control group consumed two times less vegetables one year after discharge than the main group.

Thus, in the control group we observe only a general decrease in the calorie content of the diet due to all components, while in the main group, after complex cardiac rehabilitation, we see the positive results of our recommendations in the form of a decrease in the consumption of red meat, an increase in the consumption of nuts and fish, and a decrease in daily consumption of table salt, increasing fresh vegetables and fruits and reducing alcoholic beverages.

Considering that we traditionally have a high consumption of meat products, the products of the Mediterranean diet (sea fish) are only frozen and are expensive, we focused on the daily consumption of nuts, olive oil and fresh vegetables. Our measures to correct nutrition in patients after MI in combination with physical activity have shown their effectiveness not only in reducing BMI and waist size, but also in reducing blood pressure and improving the blood lipid profile.

Physical activity

The increase in physical activity of our patients was carried out in the form of dosed walking with a gradual increase in activity time up to 150 minutes per week, as well as in the form of an increase in leisure activity time. To assess the effectiveness of physical rehabilitation, a 6-minute walk test was used.

At the time of discharge from the hospital (before the intervention), the main and control groups were comparable in terms of TSH, and a year after the intervention the groups were statistically significantly different from each other (p-0.0001). Moreover, an increase in the TSH indicator a year later was recorded for both groups: for the main and control groups by 24.3% and 10.3%, respectively. The Cohen effect size for the 6-min test at one year was 0.8, indicating a large intervention effect.

Smoking

In our study, out of 152 patients (three dropped out), 75 were smokers.

At the stage of discharge from the hospital, the groups were comparable in the number of smoking patients (p-0.1031), and after a year they were significantly different (p-0.0441). The number of smokers in the main group during this period decreased by 61.4% (p <0.0001), and in the control group - only by 16.1% (p-0.1336). Among smoking patients, the number of cigarettes smoked per day was determined. The number of cigarettes smoked per day at the beginning of the study was the same in both groups (20 cigar/day), and after a year in the main group the number of cigarettes decreased to 7, while in the control group it remained the same, and the differences turned out to be statistically significant (p = 0.000 , effect size -1.7). Thus, we can claim that our intervention in the form of motivational interviews to combat smoking in the main group was effective.

Overweight and Obesity

At discharge, the groups are comparable in terms of indicators, and after a year, the indicators of BMI (p-0.039) and WC (p-0.01) differ statistically significantly between the two compared groups. During the period of time under consideration, the indicators of BMI (p-0.000) and WC (p-0.000) changed statistically significantly in both the main and control groups. However, in the main group these indicators decreased, and in the control group, on the contrary,

they increased, and the magnitude of the Cohen effect for WC after a year was -0.35 (average effect).

The BMI indicator for the main group decreased by 4.0%, for the control group it increased by 1.7%, and the WC indicator for the main group decreased by 3.4%, and for the control group it increased by 1.8%.

The proportion of obese patients (BMI>30 kg/m²) in the main group decreased from 21 (27.6%) to 12 (15.8%) people, in the control group it increased from 21 (30.4%) to 22 (31, 9%).

Arterial hypertension

In terms of blood pressure and heart rate at discharge from the hospital, the main and control groups are similar to each other, but after a year there is a statistically significant difference between them (p <0.0001) for all three indicators. During the intervention period, SBP, DBP and heart rate in the main group decreased statistically significantly (p-0.000). In the control group, heart rate decreased statistically significantly, but SBP and DBP did not change significantly. The table also shows the level of effect of the intervention on blood pressure and heart rate - the effect is large for all indicators.

Thus, after a year, SBP decreased in the main group by 13.3%, in the control group - by 3.6%, DBP decreased in the main group by 9.4%, in the control group - by 1.7%, heart rate decreased in the main and control groups by 17.1% and 10.9%, respectively.

By the end of the analysis period, more patients in the intervention group compared to the control group achieved target blood pressure levels. Target SBP <130 mmHg. in the main group reached 62 (81.6%), DBP <80 mm Hg. 30 (39.5%) patients, while in the control group 25 (36.2%) had target SBP after a year, 8 (11.6%) patients had DBP. Such significant results in reducing blood pressure and heart rate in the main group were achieved thanks to our intervention in the form of a comprehensive rehabilitation program to modify lifestyle and increase adherence to drug therapy.

Dyslipidemia

At the time of discharge from the hospital, the indicators of the main and control groups did not differ statistically significantly from each other. A year later, a statistically significant difference between the main and control groups was revealed in the indicators of cholesterol, HDL and LDL. LDL in the study group compared to the control group decreased by an average of 0.6 (p<0.0001), HDL increased by an average of 0.2 (p<0.0001), and total cholesterol decreased by an average of 0.9 (p<0.0001).

In the main group, the indicators Cholesterol, HDL, LDL changed statistically significantly (LDL by an average of 1.1; p<0.0001; cholesterol by an average of 1.6; p<0.0001; HDL by an average of 0.18; p -0.0028). In the control group, we see statistically significant changes only in cholesterol (on average by 0.04; P – 0.0110). During this period, cholesterol levels decreased in the main and control groups by 27.4% and 7.2%, respectively. Also, when analyzing the difference in differences "before and after" between the 2 groups, an additional effect of the intervention was found for total cholesterol (-0.85; p-0.001), LDL (-0.7; p-0.001) and HDL (-0.67; p-0.001).

Adherence to drug therapy

At the time of discharge from the hospital, patients in both groups had the same compliance to medications. The use of ACE inhibitors, statins and aspirin was 100% in both groups, BB was slightly lower, but quite high in both groups (p - 0.797). Either clopidogrel or ticagrelor was used as a second antithrombotic agent, and almost all patients also used them after discharge. Calcium channel blockers and diuretics were prescribed less frequently, but the groups did not differ in their use after discharge. A year later, a statistically significant difference between the main and control groups was revealed in the use of beta blockers, ACE inhibitors, statins, aspirin, clopidogrel (lower in the control group) and CCBs (higher in the control group). In the main group, after a year, no decrease in adherence was observed for beta-blockers and aspirin; for ACE inhibitors and statins it decreased slightly (by 5.3% and 7.9%, respectively). The use of clopidogrel (+1.7%) and ticagrelor (5.5%) did not change much (one patient was switched from

ticagrelor to clopidogrel). In the control group there was a greater decrease in adherence to therapy. The main decrease occurred in ticagrelor (-61.8%; p-0.003) and statins (-46.4%; p-0.000), to a lesser extent – in beta blockers (-33.9%; p-0.000), clopidogrel (-32.7%; p-0.038) and ACE inhibitors (-23.2%; p-0.000).

In both groups, there was an increase in the use of CCBs (+49.4% in the main group and +112.1% in the control group; p-0.028) and thiazide-like drugs (+50% in the main group and +34.9% in the control group). The use of loop diuretics decreased more in the study group (-49.5% versus -30.3%), which can be explained by a decrease in the need for them, and the use of potassium-sparing diuretics decreased more in the control group (-66.7% versus -33.3%). 3%; p-0.008).

Thus, when comparing Before/After in the control group, adherence to drug therapy for beta-blockers, ACE inhibitors, statins, clopidogrel, ticagrelor and aldosterone antagonists statistically significantly decreased, and increased for CCBs. The increased use of CCBs in the comparison group can be explained by the fact that GPs prescribe drugs from this group to lower blood pressure, which is less well controlled in this group than in the main group.

Mental health

At the beginning of the study, by age (p = 0.243), modifiable risk factors (smoking, abdominal obesity, hypertension, diabetes, hyperlipidemia), severity of condition (Killip severity, Q-wave MI, recurrent MI), as well as by the prevalence of mental disorders compared the groups are also comparable. There was no extremely severe depressive disorder in any of the groups.

HADS depression scores in both groups before the intervention were statistically similar (3.04 (3.7) in the study group vs. 3.83 (3.89) in the control group, p = 0.07), as were HRDS scores (4, 2(4.7) vs. 4.5(5.3), p=0.5). HADS anxiety scores also did not differ (3.9(3.2) vs. 4.5(3.4), p=0.35, in the study and control groups, respectively). After 12 months, mean HADS depression scores were 1.1 (1.7) in the study group versus 2.6 (2.9) in the control group, p < 0.0001, HRDS scores were 1.5 (1.7) versus 3.1 (4.3), p=0.0086, HADS anxiety scores were 1.9(1.5) versus 3.0(1.8), p=0.0002, in the study and control groups, respectively.

In the main group, the decrease in anxiety and depression on both scales exceeded the decrease in the control group, but the comparison of the differences was not statistically significant. The group difference in Hamilton score at 12 months was -1.29 in favor of the baseline (95% CI, -0.7 to -1.88); SMD 0.36 (95% CI, 0.03 to 0.69). The group difference on the HADS-anxiety scale at 12 months was –0.5 in favor of the main one (95% CI, –0.09 to –0.9); SMD 0.2 (95% CI, -0.13 to 0.5). The group difference in the HADS depression score at 12 months was -0.7 in favor of the baseline (95% CI, -0.22 to -1.17); SMD 0.24 (95% CI, -0.09 to 0.56).

The proportion of patients with anxiety according to the HADS scale in the main group decreased from 18.4% to 1.3% (p=0.0002), in the control group - from 18.8% to 5.8% (p=0.001). The proportion of patients with depression in the main group decreased from 15.8% to 0 (p=0.0007) and from 14.5% to 2.6% (p=0.002), in the control group - from 14.5% to 4 .4% (p=0.04) and from 14.5% to 4.4% (p=0.19), according to the HADS and HDRS scales, respectively. The development of depression over the course of a year was found in two patients in the control group who initially did not have depression, in contrast to the main group, in which positive dynamics were observed in 100% of cases, but no significant differences were found between the changes.

A year later, in the main group, anxiety and depression on the HADS scale decreased by 2.0 and 1.9 points, respectively (p <0.05). Depression on the HDRS decreased by an average of 1.29 points (p<0.05), while in the control group there was no clinically significant decrease, and in the control group 5.8% of patients remained moderately to severely depressed. The effect size for HDRS depression at 12 months (SMD) was 0.36. The pattern of results shows a slight improvement in the CR control group, which contrasts with the larger improvement in the study group.

Conclusions:

• 10-year patient survival rate was 38.7% (95% CI 34-42%), which is lower than that of developed European countries.

• The developed rehabilitation program includes a clinical protocol for the rehabilitation of patients with myocardial infarction, based on modern scientific data, taking into account local primary care resources, and a plan for structured home visits to patients. The program has shown acceptability for implementation in practical healthcare.

• The intervention reduces rates of emergency hospitalization (RR 0.19 (95%CI 0.04-0.82), p=0.01; NNT 8.9) and progression of CHF (RR 0.15 (95%CI 0.02) -1.25), p=0.04; NNT 14.3), blood pressure, heart rate, total cholesterol, LDL cholesterol, smoking, overweight and increases exercise tolerance (p<0.05), improves quality of life profile , depression, anxiety, adherence to treatment recommendations.

Scientific novelty

As part of this study, for the first time in Aktobe:

• The low 10-year survival rate of patients after myocardial infarction was assessed and shown

• Suboptimal control of CVD risk factors (hyperlipidemia, arterial hypertension, smoking, overweight) in patients after MI in current practice has been studied and shown

• Studied and demonstrated a high rate of adverse outcomes within a year in patients after MI in current practice

• The effectiveness of available interventions of the developed program and strategy for outpatient rehabilitation of patients after MI was assessed and demonstrated

Practical significance

• Based on the data obtained, an SOP for outpatient rehabilitation of patients with MI was developed (introduced into the work of the CSM)

• Based on the data obtained, training materials and certification courses for advanced training of general practitioners and therapists have been developed

• Based on the data obtained, Methodological recommendations have been developed for practical healthcare doctors on the Rehabilitation of patients after myocardial infarction in an outpatient setting

Forms of implementation

The main provisions of the dissertation work were reported and discussed at:

1. The III International scientific and educational conference "The Internationalization of Continuing Medical Education." Prospection", (April 25-26, 2019) Aktobe, Kazakhstan

2. 12th International Scientific Conference "Challenges and Needs of the society in the area of prevention and promotion of health at all levels of health care" (June 6, 2019), Bled, Slovenia.

3. Leiden International (Bio) Medical Student Conference, (March 11, 2019), Leiden, the Netherlands

4. 42nd International medical scientific Congress", (May 2019), Ohrid, North Macedonia

5. XIII Russian scientific conference with international participation "Rehabilitation and secondary prevention in cardiology, (October 2019), Nizhny Novgorod, Russia

6. European Conference of family doctors Degam Annual Congress. (December 15-19, 2020) Berlin, Germany

7. Republican scientific and practical conference with international participation. (November 6, 2020), Semey, Kazakhstan

IV International Scientific and Practical Conference of Young Scientists and Students "Current Issues of Modern Medical Science and Healthcare" IV All-Russian Forum of Medical and Pharmaceutical Universities "For Quality Education, (April 2019), Ekaterinburg, Russia

9. II student scientific and practical conference dedicated to World Family Doctor Day "Students' contribution to the development of primary health care and family medicine", (May 2019), Aktobe, Kazakhstan.

10. III international scientific and practical conference dedicated to World Family Doctor Day "Students' contribution to the development of PHC and Family medicine" (May 14-15, 2020). Aktobe, Kazakhstan.

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