

# Prevention of non-communicable diseases – focus area of modern health care system

Development and implementation of programs of complex non-pharmacological rehabilitation, including the gradual extension of physical activity, dietary interventions work to curb smoking, controlling body weight and increase medical knowledge of patients is one of the important and effective methods of prevention of cardiovascular events in patients with non-communicable diseases. In most developed countries, such programs have become an integral part of modern treatment standards. Existing prevention programs should be adapted to the conditions of health of each country. To develop and adapt these programs in Ukraine requires knowledge about the prevalence of basic and additional risk factors, their most frequent combinations, assessment of the level of awareness of patients' lifestyle modifications.

## Key words:

primary and secondary prevention of noncommunicable diseases, cardiovascular rehabilitation program.

Non-communicable diseases (NCD) are the main cause of mortality in developed countries of the world – their share is up to 63 % of all annual fatal outcomes, which equals to 36 million fatal outcomes. The fact that, among all patients died of NCD, 9 million of individuals are below 70 years old, stresses that these diseases do not represent the problem of older age groups solely. At the same time, the experts insist that more than three fourths of the fatal outcomes can be prevented by the way of modification of the main risk factors. The fact that majority of NCDs (cardiovascular diseases, diabetes mellitus, obesity, obstructive pulmonary diseases, dystrophic processes of musculoskeletal system) have common risk factors: smoking; poor physical activity; improper nutrition; carbohydrate and cholesterol metabolism disorders; alcohol abuse, is noteworthy. All these factors can be and have to be modified in the modern society. It is well known that the main and the most effective strategy of decreasing NCD-related mortality is fighting against the above risk factors. Expansive surgical procedures (coronary artery bypass graft, coronary artery stenting, valve replacement), according to WHO experts, have no essential effects on demographic situation, while more than 1/3 of NCD-induced fatal outcomes may be prevented due to lifestyle modification and control of risk factors. Nevertheless, in spite of the fact that our knowledge of the effects of one or another risk factors on the health state are rather profound, control of risk factors in majority of European countries is obviously insufficient. Thus, according to the data by EUROASPIRE III registry, lifestyle of majority of patients suffering from coronary heart disease (CHD) does not conform to the standards of a «healthy» one. Thus, in spite of CHD diagnosis, over 17 % of the patients continued smoking, 81 % had body mass index more than 25 kg/m<sup>2</sup>, 56 % did not achieve the target blood pressure values, 51 % had elevated cholesterol levels, and 35 % had high glycated hemoglobin values. According to the data by this registry, by no means all of the patients with proven CHD received life-supporting therapy. For example, only 78 % of the patients received statins, and angiotensin



**H.D. Fadeenko,  
H.S. Isaeva,  
L.A. Reznik**

SI «National Institute of Therapy named after L.T. Mala of NAMS of Ukraine», Kharkiv

## КОНТАКТНА ІНФОРМАЦІЯ

**Ісаєва Ганна Сергіївна**  
к. мед. н.

61039, м. Харків, просп. Постишева, 2а  
Тел. (057) 373-90-15  
E-mail: anna\_isayeva\_74@yahoo.co.uk

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converting enzyme inhibitors/angiotensin II blockers were prescribed only to 71 % of the examined patients [25, 33]. It has been concluded by the experts of EUROASPIRE task force from the results of this study that majority of European countries has high potential of decreasing cardiovascular mortality rate by the way of aggressive control of risk factors. Besides, the researchers insist that implementation of the existing recommendations for control of risk factors and secondary medicamental prevention is one of focus areas for the modern health care system [14, 38].

Preventive measures have to be carried out under close monitoring of health care professionals. The absence of medical supervision promotes decrease of patients' compliance, decreases productivity, and increases the frequency of adverse events. One of potential ways to promote healthy lifestyle is patients' training, which may be performed either in group setting or individually. It has been established that training programs have essential effects on both patient's ability to control behavioral risk factors and medicamental therapy compliance in NCD patients [28, 44]. Medical training of patients is one of the most important constituents of rehabilitation programs in France [11]. Thus, H. Douard demonstrates in his study that shortening of hospitalization time due to novel medical technologies (percutaneous coronary intervention, thrombolysis, coronary artery bypass grafting) in patients with acute coronary syndrome promotes their attitude to this event as to a minor incident, and therefore, the patients lack motivation to lifestyle changes. In this case, long-term patient training programs in hospitals should promote their more serious approach to their health and formation of responsibility for it [17]. At the same time, higher attention should be paid first of all to non-medicamental measures (increased physical activity, healthy nutrition, smoking cessation, and self-control of stress). Thus, it has been established that the effect of medicamental therapy on all-cause and cardiovascular mortality pattern is less than 47 %, while lifestyle modification allows decreasing this parameter by more than 55 % [16]. It has been shown that coronary heart disease patients involved in secondary rehabilitation programs not just achieved more pronounced decrease of body mass index and blood pressure, but also increased their tolerance to physical load, in particular, due to longer time to ischemia onset during stress testing [18].

Currently, NCD secondary and primary preventing programs have been developed and implemented in majority of developed countries. These programs underwent essential modifications during their operation. Initially, they were targeted only

at gradual increase of patients' physical activity. Expansion of our knowledge of risk factors has led to introduction of so-called multidisciplinary programs, which, besides physical activity, included the training component as well. The first multidisciplinary rehabilitation program was suggested in 1950 by Hellerstein; currently, this model is being used in majority of developed countries of the world [13]. Modern patient rehabilitation programs are rather broader and include both physical activity correction and dietary interventions, smoking cessation consultations, body weight control, and patient's training in basics of medical knowledge of dyslipidemias, arterial hypertension, and risk factors. All programs have aggressive approach to the control of risk factors. A mandatory component of these programs is medicamental therapy control by qualified health care professional in accordance with existing standards. The important role of increased physical activity was proven by many studies, but Whitehall and INTERHEART research programs are among the most valid ones [43, 45]. These studies, first of all, showed the benefits of moderate and regular physical activity. Thus, it has been found out that hard physical exercise has no positive effects on health [7, 48]. Meta-analysis of 11 randomized studies for the examination of efficacy of regular physical load (including 2285 patients) has shown the decrease in all-cause mortality rate by 28 % and the decrease of recurrent myocardial infarction by 24 % [15]. Meta-analysis conducted by McClure T et al., has shown the decrease of anxiety in patients with coronary heart disease as affected by regular physical exercise, which, in general, promoted improvement of the quality of life [37]. Rehabilitation programs should be mainly focused on deepening of patients' medical knowledge. Thus, the study by P. Jankowski has shown that the effect of rehabilitation program was much higher in patients with higher level of knowledge [31]. Even the willingness to participate in rehabilitation program in patients following an acute coronary syndrome is related with their educational level [30]. The work with patients aimed at smoking cessation is an important constituent of rehabilitation programs. It has been proven that smoking cessation decreases cardiovascular mortality rate by 50 % during the first years. It has been established that individualized consultations on smoking cessation using the relevant medications as needed is more effective than doctor's general recommendations [41, 42].

The importance of dietary interventions has been proven in many studies. Essential decrease in mortality rate is observed even in minimal positive changes in nutrition [26, 34]. Majority of recom-

mendations are based on Mediterranean diet or DASH diet. The experience of using Alternative Healthy Eating Index (AHEI) is rather interesting. A particular feature of this approach is that this diet takes into consideration not only cardiovascular pathology, but majority of NCDs as well. Decrease in all-cause mortality rate by 25 % and cardiovascular mortality rate by 40% has been established in patients having a high Alternative Healthy Eating Index [6].

Smoking cessation is one of the most essential components of all rehabilitation programs. Positive effect of this measure is apparent [5, 12]. At the same time, practitioners know very well that this task is among the hardest for smokers. One of smoking cessation methods is group work, where demonstration of other patients' examples greatly enhances motivation of other group members [35]. It has been established that patients with low education levels experience more difficulties when quitting smoking, and systematic educational work promotes increase of their motivation and increases the chances of successful smoking cessation [27, 51]. An interesting fact is that the programs aimed at night sleep improvement also promote smoking cessation [22].

One of essential problems related with development of cardiovascular rehabilitation programs is co-morbidity of pathological conditions (coronary heart disease, arterial hypertension, diabetes mellitus, obesity, joint diseases, osteoporosis etc.) [2–4]. In this event, rehabilitation programs have to include the effects on several diseases and consider potential aggravation in other systems. One of the examples of successful secondary rehabilitation programs is the program for patients with arthritis [50].

Currently, complex rehabilitation programs for patients with a history of cardiovascular event are implemented in such countries as France, Canada, USA, Germany, and Italy. Thus, in the USA, secondary rehabilitation programs are covered by medical insurance and include 8 to 12 weeks of sessions with mean duration of up to 45 minutes [46]. Almost 60 % of patients following percutaneous coronary intervention participate in rehabilitation programs [9]. The results of US researchers are indicative that even low physical activity during a 12-week rehabilitation program decreases all-cause mortality rate by 30 %; besides, activity increase by 1 metabolic unit promotes the decrease of mortality rate by 13 % every year [10]. Efficacy of rehabilitation programs has been proven for various patients' age groups [39]. In Canada, duration of rehabilitation programs for patients with established cardiovascular diseases is somewhat shorter — 6 to 8 weeks; short yet intensive

rehabilitation programs — 3–4 weeks — are popular in European Union countries.

Canada is a country with one of the most effective and accomplished system of preventive measures. Thus, 200 rehabilitation-preventive programs capable to enroll over 500 000 new patients annually are operating in the country simultaneously. Canadian rehabilitation system is based on the following provisions: systemic referral of patients to rehabilitation centers, mandatory correction of behavioral risk factors, development of individual system to control goal achievements, professional supervision of the program accomplishment. More than 90 % of rehabilitation centers offer training of patients, individual assessment of risk factors, physical exercise, and periodic assessments of physical tolerance of the physical load. Among those, 80 % of the centers hire experienced therapists and cardiologists, and 70 % of the centers offer evaluation of depression level [24]. Mean duration of the programs is up to 5 months with sessions attendance frequency 2–3 times a week. Patients' compliance with prophylactic programs in Canada reaches 85 % [40]. Cardiovascular mortality in groups of patients attending prevention centers is 50 % as low as in patients not attending these centers [8]. The result of this work is that, in Canada, the chances of dying of NCDs for people aged 30–60 years old is one of the lowest among countries with high income level (WHO, 2014).

One of the countries with the longest life span is Sweden. The country has implemented a national program of preventive measures called Lifestyle Project, which actively discusses various dietary interventions; dietary recommendations have been developed within the scope of the project, and active lifestyle is being widely implemented. Secondary rehabilitation programs are intended for 2–3 months. These programs include training, extension of physical activity, dietary interventions, control of stress and depression level. A particular feature of the country is continuous operation of the state audit SWEDEHEART monitoring patients' participation in rehabilitation programs and providing for mandatory control of the condition of patient with a history of cardiovascular event, in a year. As a result of this work, it was established for the year 2012 that 55 % of the smokers give up smoking and 65 % of the patients reach target blood pressure levels after 1 year of follow-up [32]. In USA, there are many various secondary and primary prevention programs. One of interesting methods in training of patients according to short yet intensive «health programs» lasting up to 10 weeks, combining dietary interventions and physical activity. Patients' training in accordance with these programs results

in decreased body weight in 1 year and effective control of risk factors [49]. On the other hand, Germany has implemented long-term, lasting up to 36 months, secondary prevention programs, combining both hospital course and outpatient step, and mandatory including phone contacts with the patient. It has been shown that these courses considerably improve patients' health-related quality of life [36]. Rehabilitation-prevention programs for patients following myocardial infarction are widespread in Japan, yet, they are carried out in hospitals with mandatory participation of a cardiologist [23].

In 2000, WHO experts have formulated Global Strategy on Prevention and Control of Non-Communicable Diseases. In 2003, WHO has suggested Global Strategy on Diet, Physical Activity, and Health. In 2008–2013, Action Plan on the Global Strategy for the Prevention and Control of Non-Communicable Diseases has been implemented. A similar Action Plan developed for the years 2013–2020 establishes 9 global goals to be achieved, and 25 indicators for these goals. Nevertheless, WHO experts insist that these documents have to serve as examples, and an own action plan has to be developed for each country and adapted to its conditions. Besides, WHO specialists stress that prevention programs have to be implemented at national and regional level in each country.

One of promising areas is organization of remote rehabilitation programs implemented through the Internet [21]. Telerehab III was one of the first such projects. This project was carried out with participation of 140 patients with CHD and cardiac failure randomized into two groups. Patients of the first group underwent conventional rehabilitation program in a hospital, and patients of the second group used the Internet resource with video course. It has been established that the Internet rehabilitation program was superior and the patients reached higher tolerance to physical load (according to cardiopulmonary tests and  $O_2$  consumption), and higher parameters of quality of life [19]. Besides, data of two meta-analyses were published, which compared the effects of Internet programs and conventional rehabilitation programs, yet, have not found any advantages of the latter [20, 29]. An experience of Turkey appears new and interesting,

where smoking cessation program via SMS communications was realized. The project included adults who have expressed their wish to give up smoking. The program participants received SMS communications with recommendations on smoking cessation for 4 months. Program compliance rate was very high (94 %), 13 % of the participants did not smoke in 12 weeks after the last communication. The study participants evaluated SMS communications as readily understandable and interesting [52]. It is worth mentioning that smoking cessation rate after usual doctor's advice is very low – less than 2–3 % [37].

Development of recommendations on lifestyle modification (in particular, sedentary lifestyle, excessive alcohol consumption and smoking) is top-of-the-agenda in Ukraine as well. It was found out that elevated blood total cholesterol level and smoker status have (8 %) of women and (19 %) of men; population studies of urban population have revealed that 45 % of men and 16 % of women have tobacco addiction [1]. In spite of the fact that the role of these risk factors is proven, there is no registry accounting for prevalence of individual risk factors and their combinations in Ukraine. This knowledge is necessary for development of effective rehabilitation programs adapted to our country. The information about both patients' and doctors' awareness of potential modification of risk factors is of high importance. Besides, Ukraine has no standardized recommendations on correction of risk factors, and foreign analogues do not always conform to social-economic conditions of our country. Thus, implementation of dietary approaches in Ukrainian population is only possible following their adaptation to the conditions of our country.

Therefore, the experience of countries with low cardiovascular mortality rate provides strong evidence that complex rehabilitation programs are among the most effective instruments decreasing the risk of cardiovascular events and all-cause mortality. Development and adaptation of these programs for Ukraine requires knowledge on the prevalence of major and additional risk factors, their most frequent combinations, evaluation of doctors' awareness and preparedness to modify their patients' lifestyles. Foundation of prophylactic centers has to be supported by the state and have priority at national policy level.

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### Г.Д. Фадєєнко, Г.С. Ісаєва, Л.А. Рєзнік

ДУ «Національний інститут терапії імені Л.Т. Малої НАМН України», Харків

## Профілактика неінфекційних захворювань — пріоритетний напрямок сучасної системи охорони здоров'я

Розробка та впровадження у практику програм комплексної немедикаментозної реабілітації, що включають поступове розширення фізичної активності, дієтичні втручання, роботу по припиненню куріння, контроль маси тіла та підвищення медичних знань пацієнтів, є одним із важливих і ефективних методів профілактики серцево-судинних подій у пацієнтів з неінфекційними захворюваннями. У більшості розвинених країн такі програми стали невід'ємною частиною сучасних стандартів лікування. Існуючі профілактичні програми повинні бути адаптовані до умов охорони здоров'я кожної конкретної країни. Для розробки і адаптації цих програм в Україні потрібні знання про розповсюдженість основних та додаткових факторів ризику, їх найбільш частих комбінацій, оцінка рівня обізнаності щодо модифікації способу життя пацієнтів.

**Ключові слова:** первинна та вторинна профілактика неінфекційних захворювань, програми кардіоваскулярної реабілітації.

### Г.Д. Фадееенко, А.С. Исаева, Л.А. Резник

ГУ «Национальный институт терапии имени Л.Т. Малой НАМН Украины», Харьков

## Профилактика неинфекционных заболеваний — приоритетное направление современной системы охраны здоровья

Разработка и внедрение в практику программ комплексной немедикаментозной реабилитации, включающих расширение физической активности, диетические вмешательства, работу по пресечению курения, контроль массы тела и повышение медицинских знаний пациентов, является одним из важных и эффективных методов профилактики сердечно-сосудистых событий у пациентов с неинфекционными заболеваниями. В большинстве развитых стран такие программы стали неотъемлемой частью современных стандартов лечения. Существующие профилактические программы должны быть адаптированы к условиям здравоохранения каждой конкретной страны. Для разработки и адаптации этих программ в Украине нужны знания о распространенности основных и дополнительных факторов риска, их наиболее частых комбинаций, оценка уровня осведомленности врачей по вопросам модификации образа жизни пациентов.

**Ключевые слова:** первичная и вторичная профилактика неинфекционных заболеваний, программы кардиоваскулярной реабилитации.