UDC 613.71:616-036.12-071.1

I.A. Krylova*, A.L. Slobodjanjuk, V.I. Kupaev, M.S. Nurdina

Samara State Medical University, Samara, Russia

THE EFFECT OF PHYSICAL ACTIVITY ON SUBOPTIMAL HEALTH STATUSE

Abstract

Patients may have risk factors but consider themselves healthy. In this case a patient will not consult a doctor, but will have a suboptimal status of health. The study of the patient's health at different levels of physical activity is an important issue of preventive medicine. **The objective of the study:** To investigate the impact of physical activity on the development of suboptimal health status in conjunction with other risk factors of noncommunicable diseases in outpatients who consider themselves healthy and did not seek for medical advice in the last 3 months. **Materials and methods:** 351 people (133 men and 218 women) aged 18 to 75 years were examined after obtaining their informed consent. Patients were divided into 8 groups according to the international physical activity questionnaire (IPAQ). In addition to the classic clinical and laboratory examination, patients were interviewed using the following questionnaires: Suboptimal Health Status (SHSQ-25), Hospital Anxiety and Depression Scale (HADS), Perceived Stress Scale (PSS). Statistical processing was carried out using Microsoft Excel 2010 and Statistica 10.0 software. **Results.** When studying the values obtained, the fact of the differences in some values was determined: high blood pressure in groups 3 and 4, increasing of body mass in groups 2, 3, 5 and 8. These results prove the relationship between risk factors and physical activity level. Significant differences between actual values of mean age and anxiety level in groups with high and low values of suboptimal health status were revealed. Significant differences in suboptimal health status were determined, which imaged the presence of risk factors of noncommunicable diseases in groups with different physical activity (women's age over 45 years old, overweight, monthly use of alcohol, hypercholesterinemia and high level of depression). Significant differences of risk factors in patients of groups with high and low value of suboptimal health status were revealed: age over 45 years, high systolic and diastolic blood pressure, high levels of anxiety. The groups 2, 3, 6 and 7 of physical activity significantly differed in the suboptimal health status. **Conclusion.** In patients who consider themselves healthy and did not consult a doctor for 3 months or more, the risk factors of noncommunicable diseases were determined more common in groups of patients who are not engaged in physical activity,. Differences in values of suboptimal health status in the presence of risk factors of noncommunicable diseases were revealed. The SHSQ-25 questionnaire objectively imaged the main screening indices of chronic disease risk factors. It is simple to use in primary health care, and it is an economical and effective tool for monitoring subclinical, reversible stages of chronic diseases.

Key words: *physical activity, suboptimal status, risk factors, screening*

For citation: Krylova I.A., Slobodjanjuk A.L., Kupaev V.I., Nurdina M.S. THE EFFECT OF PHYSICAL ACTIVITY ON SUBOPTIMAL HEALTH STATUSE. The Russian Archives of Internal Medicine. 2018; 8(4): 304-312 [In Russian]. DOI: 10.20514/2226-6704-2018-8-4-304-312

DOI: 10.20514/2226-6704-2018-8-4-304-312

SHSQ-25 — Suboptimal Health Status Questionnaire; IPAQ — The International Physical Activity Questionnaire; HADS — Hospital Anxiety and Depression Scale; PSS — Perceived Stress Scale; BMI — body mass index.

*Contacts. E-mail: raznoe.2009@list.ru

Noncommunicable diseases are currently the most important cause of untimely death [1, 2, 3]. The determining risk factors for these diseases are hypodynamia, overweight, high blood pressure, smoking, psychosocial distress [1, 4]. Patients who have these risk factors, but consider themselves healthy, do not feel any changes and do not present any active complaints, as a result of which they do not see sufficient reasons to visit a doctor [3]. This fact makes the timely detection and prevention of noncommunicable diseases impossible.

Low physical activity is one of the risk factors for noncommunicable diseases [1, 2, 4]. The relationship between physical activity and noncommunicable diseases is considered confirmed since the publication of studies by the Morris and Paffenbarger groups. Maintaining adequate physical activity lowers the risk of noncommunicable diseases, regardless of other risk factors. The risk of cardiovascular diseases increases almost one and a half times in people living a sedentary lifestyle [2, 4]. Hypodynamia is a common problem: about 60 % of the population does not have the recommended minimum in the form of 30 minutes moderate-intensity activity per day. The percentage of persons without any physical activity during a week can reach 25 % [1, 2, 4, 6]. Regular physical exercises decrease the risk of myocardial infarction and have a positive effect on reducing morbidity and mortality from noncommunicable diseases [2, 4, 5]. In addition, adequate physical activity helps to maintain optimal body weight, has a positive effect on the body's metabolism, decreases blood pressure, has a beneficial effect on the state of the patient's cardiorespiratory system, and improves health and physiological sleep [2, 4, 5, 6].

A method for determining the suboptimal health status has been proposed by Wei Wang [3, 7]. Suboptimal health status implies a physical state between health and illness, characterized by minor health complaints, general weakness and fatigue for 3 months; it is considered a subclinical, reversible stage of chronic disease [3]. Typically, patients with the suboptimal health status have one or more risk factors for noncommunicable diseases, elimination of which can result in the optimal health status.

The Objective of the Study

To investigate the impact of physical activity on the development of suboptimal health status in conjunction with other risk factors for noncommunicable diseases in outpatients who consider themselves healthy and did not seek medical attention in the last 3 months.

Materials and Methods

During the period from September 2017 to February 2018, a method of total sampling was used in a specially organized study, based on the lists of patients attached to the general practitioner offices and subject to periodic medical examinations. The study was conducted at medical institutions of the Samara region by a primary health care team which consisted of professors from the Department of Family Medicine at Institute of Professional Education "Samara State Medical University" and general practitioners from the Samara region. The initial sample consisted of 1,027 subjects. Of these, 422 subjects were regularly checked up due to chronic diseases. Two hundred and thirty-one subjects requested medical assistance within last 3 months, 23 subjects did not consent to participate in the study. The Informed Consent was obtained for 351 outpatients (133 men and 218 women) aged from 18 to 60 years; the mean age was 37.9 (30.–48.0). Inclusion criteria: patients who considered themselves healthy or did not seek medical attention within the last 3 months. Exclusion criteria: patients with clinically significant health problems and previously diagnosed diseases.

Parameters examined: anthropometry (measurement of height, weight, waist circumference), blood pressure, total cholesterol, standard clinical, laboratory and instrumental studies, smoking and alcohol use, suboptimal health status, level of physical activity, anxiety and depression levels.

Based on the data obtained during anthropometric measurements, Kettle body mass index (BMI) (kg/m^2) was calculated and assessed according to WHO guidelines (BMI less than 18.5 kg/m^2 is classified as body weight deficiency; 18.5–24.9 kg/m^2 — as the normal body mass index; 25.0-29.9 kg/m^2 — as preobesity; 30.0–34.9 kg/m^2

as class I obesity; 35.0–39.9 kg/m^2 — as class II obesity; more than 40.0 kg/m^2 — as class III obesity; abdominal obesity is defined as waist circumference ≥ 94 cm in men and ≥ 80 cm in women).
In accordance with the national guidelines "Cardiovascular Prevention 2017" and the target levels of risk factors determined by the Methodological Recommendations "Organization of clinical examinations and preventive medical examinations of adults" (Moscow, 2013) of the Ministry of Health of the Russian Federation and the Federal State Budgetary Institution "State Research Center for Preventive Medicine" of the Ministry of Health of the Russian Federation, high blood pressure was diagnosed at values of ≥ 140/90 mm Hg; high cholesterol level — at values above 5 mmol/L; smoking, regardless of its degree/severity, was assessed as a cardiovascular risk factor for further determination of a personalized smoking cessation strategy; excessive alcohol consumption was diagnosed when consuming dangerous doses: 30 mL for men and 20 mL for women, in terms of pure ethanol.
The suboptimal health status was detected using an International Questionnaire SHSQ-25. The questionnaire consists of 25 questions with 5 variants of answers to each question: never, rarely, often, very often, always, to which points are awarded from 0 to 4, respectively; on scales: fatigue, complaints of the cardiovascular system, digestive system, immune system, and mental state. The questionnaire is validated in Russia. A score on the questionnaire of more than 14 indicates the suboptimal status, which requires a more thorough examination of the patient [8].
Physical activity was assessed by a standard International Physical Activity Questionnaire (IPAQ), where the patient chooses one of eight statements reflecting the regularity and frequency of their physical activity, recommended for practically healthy patients with or without risk factors. The standard questionnaire for assessing the increased risk of death or injury during physical activity is a safe and informative method for assessing physical activity [2, 4, 9, 12, 13]. Anxiety and depression levels were assessed using the hospital anxiety and depression scale HADS (contains 14 statements for two subscales: "anxiety" and "depression" with a result for each of them, for three ranges of values: 0–7: normal, absence of reliably expressed symptoms of anxiety/depression; 8–10: subclinical anxiety/depression; 11 and higher: clinical anxiety/depression); the PSS scale determined the level of exposure to stress (low level: 0–6 points; normal level: 7–19 points; high level: 20–30 points; very high level: 31–40 points).
Statistical processing was carried out using Microsoft Excel 2010 and Statistica 10.0 software during statistical data processing and normality tests. As a result, χ^2, Mann-Whitney, Kruskal-Wallis tests were used. Differences were considered statistically significant at $p<0.05$.

Results

As a result of the study, risk factors for noncommunicable diseases were detected in 267 subjects. (78.1 %): high blood pressure was diagnosed in 23 subjects (6.6 %), hypodynamia in 238 subjects (67.8 %), overweight in 121 subjects (37.5 %); smoking in 64 subjects (18.2 %), excessive alcohol consumption in 88 subjects (25.1 %); hypercholesterolemia in 116 subjects (33.04 %), high level of anxiety in 46 subjects (13.1 %); high level of depression in 32 subjects (9.1 %).
Depending on the physical activity level according to the International Physical Activity Questionnaire (IPAQ), patients are divided into 8 groups: *group 1* (58 subjects: 21 men, 37 women): not engaged in intensive or moderate physical activity regularly and are not going to start in the next 6 months; *group 2* (41 subjects: 14 men, 27 women): not engaged in intensive or moderate physical activity regularly, but considering starting in the next 6 months; *group 3* (72 subjects: 29 men, 43 women): trying to start intensive or moderate physical activity, but not regularly; *group 4* (67 subjects: 29 men, 38 women): engaged in intense physical activity less than 3 times a week (or) moderate physical activity less than 5 times a week; *group 5* (19 subjects: 3 men, 16 women) engaged in moderate physical activity for 30 minutes a day, 5 days a week for the last 1–5 months; *group 6* (37 subjects: 10 men, 27 women) engaged in moderate physical activity for 30 minutes a day, 5 days a week for the last 6 (or more) months; *group 7* (15 subjects: 8 men, 7 women) engaged in intense physical activity

3 or more times a week for the last 1-5 months; *group 8* (42 subjects: 27 men, 15 women) engaged in intense physical activity 3 or more times a week for the last 6 (or more) months.

After dividing patients by the pattern of physical activity (according to the IPAQ scale) into 8 groups, there were no significant differences in the actual values in terms of the suboptimal status between the groups (the median values were 12.0 (1.0–33.0) in group 1; 16.0 (4.0–39.0) in group 2; 15.0 (0.0–49.0) in group 3; 11.5 (1.0–43.0) in group 4; 20.0 (2.0–55.0) in group 5; 9.0 (0.0–45.0) in group 6; 5.0 (0.0–24.0) in group 7; 8.5 (0.0–60.0) in group 8; z=1.85; p>0.05). Significant differences in actual values were observed in women by age (the median values were 44.0 (38.5–56.5) in group 1; 42 (34.0–49.0) in group 2; 35 (23.0–49.0) in group 3; 38.5 (30.0–48.0) in group 4; 43 (24.0–51.0) in group 5; 45.5 (33.0–53.0) in group 6; 40 (23.0–52.0) in group 7; 36 (24.0–47.0) in group 8; z=0.74; p<0.05). There were significant differences in body weight between patients in some groups: significant differences were detected between

Table 1. *Characteristics of the study groups by actual values*

Sign	group 1 n=58	group 2 n=41	group 3 n=72	group 4 n=67	group 5 n=19	group 6 n=37	group 7 n=15	group 8 n=42	Reliability
Me(IQR)SHS	12.0 (1.0–33.0)	16.0 (4.0–39.0)	15.0 (0.0–49.0)	11.5 (1.0–43.0)	20.0 (2.0–55.0)	9.0 (0.0–45.0)	5.0 (0.0–24.0)	8.5 (0.0–60.0)	z=1.85; p>0.05
(Me(IQR)) Men's age	49 (29.0–52.0)	42.5 (32.0–58.0)	41.0 (31.0–47.0)	36.0 (30.0–45.0)	41.0 (33.0–45.0)	39.5 (39.0–51.0)	35 (24.5–48.0)	35 (27.0–48.0)	z=0.71; p>0.05
(Me(IQR)) Women's age	44.0 (38.5–56.5)	42 (34.0–49.0)	35 (23.0–49.0)	38.5 (30.0–48.0)	43 (24.0–51.0)	45.5 (33.0–53.0)	40 (23.0–52.0)	36 (24.0–47.0)	z=0.74; **p<0.05**
Mean age (Me(IQR))	43.0 (35.0–53.0)	42.16 (34.0–50.0)	38.18 (25.0–49.0)	37.9 (30.0–48.0)	41.0 (33.0–51.0)	41.5 (30.0–53.0)	41.5 (30.0–53.0)	37.0 (23.0–49.0)	z=1.32; p>0.05
High blood pressure (Me(IQR))	120 (120–128)	120 (110–127.5)	**120 (110–122.5)**[5]	**120 (110–120)**[6]	120 (110–140)	120 (110–120)	120 (110–120)	120 (110–120)	
Body mass index (Me(IQR))	24.5 (23.0–27.5)	**24.6 (22.9–27.0)**[1*]	**24 (22.0–27.4)**[2]	25.3 (22.9–28.0)	**30.3 (25.7–33.2)**[3]	24 (21.0–26.0)	24 (22.0–25.2)	**23 (20.0–25.0)**[4]	
Total cholesterol (Me(IQR))	4.4 (4.0–5.0)	4.4 (4.4–5.5)	4.4 (4.4–4.7)	4.4 (4.4–5.4)	5.5 (4.4–6.2)	4.8 (4.4–5.5)	4.6 (4.3–5.0)	4.4 (4.0–4.6)	z=0.414; p>0.05
Level of anxiety (above 7 points) (Me(IQR))	7.0 (5.0–9.0)	6.7 (4.7–8.7)	7.0 (5.1–9.0)	6.5 (4.5–8.5)	6.6 (6.0–10.1)	5.0 (4.0–8.0)	5.1 (4.4–5.0)	6.6 (4.5–8.5)	z=0.7042; p>0.05
Level of depression (above 7 points) (Me(IQR))	8.3 (6.0–11.5)	8.7 (6.7–11.7)	8.3 (6.1–11.0)	7.5 (4.5–9.5)	7.6 (5.0–10.1)	5.0 (4.0–8.0)	5.1 (4.4–5.0)	3.6 (2.5–7.5)	z=0.7102; p>0.05

Note: * reliable results are indicated **in bold**

[1]Significant differences between groups 2 and 5 z=3.443730; p=0.016065

[2]Significant differences between groups 3 and 5 z=3.765397; p=0.004656

[3]Significant differences between groups 5 and 6 z=3.929309; p=0.002385

[4]Significant differences between groups 5 and 8 z=4.830237; p=0.00003

[5]Significant differences between groups 3 and 8 z=4.230237; p=0.00022

[6]Significant differences between groups 4 and 8 z=4.673306; p=0.00003

group 2 (the median value was 24.6 (22.9–27.0)) and group 5 (the median value was 30.3 (25.7–33.2)); z=3.443730; ρ=0.016065. Significant differences were revealed between group 3 (median 24 (22.0-27.4)) and group 5 (median 30.3 (25.7–33.2)); z=3.765397; ρ=0.004656; between group 5 (median 30.3 (25.7–33.2)) and group 6 (median 24 (21.0–26,0)); z=3.929309; ρ=0.002385; between group 5 (median 30.3 (25.7–33.2)) and group 8 (median 23 (20.0–25.0)); z=4.830237; ρ=0.00003; between group 3 (median 24 (22.0–27.4)) and group 8 (median 23 (20.0–25.0)); z=4.230237; ρ=0.00022; between group 4 (median 25.3 (22.9–28.0)) and group 8 (23 (20.0–25.0)); z=4.673306; ρ=0.00003. Other parameters showed no significant differences (Table 1).

However, the analysis of risk factors in the study groups revealed a significant difference in the presence of the suboptimal status: in 19 subjects in group 1 (32.75 %); in 20 subjects in group 2 (48.8 %); in 42 subjects in group 3 (58.3 %); in 24 subjects in group 4 (35.8 %); in 11 subjects in group 5 (57.9 %); in 4 subjects in group 6 (10.8 %); in 2 subjects in group 7 (13.3 %); in 13 subjects in group 8 (30.9 %); χ^2=34.837; ρ<0.01. Women aged over 45 years were significantly more likely to be found in groups with low physical activity: in 19 subjects in group 1 (32.75 %); in 13 subjects in group 2 (31.7 %); in

Table 2. *Characteristics of the study groups by the risk factors of noncommunicable diseases*

Sign	group 1 n=58	group 2 n=41	group 3 n=72	group 4 n=67	group 5 n=19	group 6 n=37	group 7 n=15	group 8 n=42	Reliability
SHS more than 13	19 (32.75)	20 (48.8)	42 (58.3)	24 (35.8)	11 (57.9)	4 (10.8)	2 (13.3)	13 (30.9)	**χ^2=34.837; ρ<0.01**
Men aged over 45 years	16 (27.6)	8 (19.5)	10 (13.9)	13 (19.4)	3 (15.8)	6 (16.2)	3 (20.0)	8 (19.0)	χ^2=4.321; ρ>0.05
Women aged over 45 years	19 (32.8)	13 (31.7)	15 (20.8)	14 (20.9)	7 (36.8)	16 (43.2)	3 (20.0)	5 (11.9)	**χ^2=15.385 ρ<0.05**
High blood pressure	4 (6.7)	2 (4.9)	4 (5.6)	3 (4.5)	4 (21.1)	0	0	1 (2.4)	χ^2=13.869; ρ>0.05
Overweight (BMI)	17 (29.3)	**14 (34.1) [1*]**	**28 (38.9) [2]**	25 (37.3)	**12 (63.2) [3]**	14 (37.8)	4 (26.7)	**7 (16.7) [4]**	
Smoking	13 (22.4)	6 (14.6)	17 (23.6)	12 (17.9)	2 (10.6)	3 (8.1)	3 (20.0)	8 (19.0)	χ^2=5.789; ρ>0.05
The use of alcohol equivalent to > 30 (20) ml of ethanol	9 (15.5)	14 (34.1)	15 (20.8)	20 (29.9)	4 (21.1)	5 (13.5)	7 (46.7)	14 (33.3)	**χ^2=14.163; ρ<0.05**
Hypercholesterolemia (cholesterol level more than 5.0 mmol/L)	18 (31.03)	19 (46.3)	15 (20.8)	24 (35.8)	17 (89.5)	13 (35.1)	4 (26.7)	6 (14.3)	**χ^2=43.939; ρ<0.01**
High level of anxiety	8 (13.8)	8 (19.5)	7 (9.7)	7 (10.5)	4 (21.1)	5 (26.3)	3 (20.0)	4 (9.5)	χ^2=4.8; ρ>0.05
High level of depression	9 (15.5)	8 (19.5)	6 (8.3)	8 (11.9)	1 (5.3)	0 (0)	0 (0)	0 (0)	**χ^2=18.683 ρ<0.01**

Note: * reliable results are indicated **in bold**

[1]Significant differences between groups 2 and 5 z=3.443730; ρ=0.016065

[2]Significant differences between groups 3 and 5 z=3.765397; ρ=0.004656

[3]Significant differences between groups 5 and 6 z=3.929309; ρ=0.002385

[4]Significant differences between groups 5 and 8 z=4.830237; ρ=0.00003

15 subjects in group 3 (20.8 %); in 14 subjects in group 4 (20.9 %); in 7 subjects in group 5 (36.8 %); in 16 subjects in group 6 (43.2 %); in 3 subjects in group 7 (20.0 %); in 5 subjects in group 8 (11.9 %); χ^2=15.385; p<0.05. Monthly consumption of alcohol, the presence of hypercholesterolemia and a high level of depression also proved to be significantly different depending on the level of physical activity (χ^2=14.163; p<0.05; χ^2=43.939; p<0.01; χ^2=18.683; p<0.01, respectively). There were significant differences in overweight between groups 2 and 5 (z=3.443730; p=0.016065), groups 3 and 5 (z=3.765397; p=0.004656), between groups 5 and 6 (z=3.929309; p=0.002385) and between groups 5 and 8 (z=4.830237; p=0.00003) (Table 2).

Significant differences were found in the mean age when analyzing the mean values of the studied parameters in the comparative analysis of groups with high and low suboptimal status values: the median of suboptimal status values less than 13 points was 38.6 (19–75); the median of suboptimal status values higher than 13 points was 45.04 (18–75); z=4.104009; p=0.000041. The level of anxiety at low suboptimal status values was 3.6 (2.5–7.5), and at high values — 8.7 (6.7–11.7); z=4.00034; p=0.028. Other parameters showed no significant differences (Table 3).

However, significant differences in age were revealed in a comparative analysis of risk factors for noncommunicable diseases in groups with high and low values of the suboptimal health status: the suboptimal status value was less than 13 points in 26 men aged over 45 years and was higher than 13 points in 21 subjects (x^2=6.309; p=0.013); the suboptimal status value was less than 13 points in 35 women aged over 45 years and was higher than 13 points in 57 subjects (x^2=4.324; p=0.038). The number of patients in the groups with low values of the suboptimal status was significantly different when compared in terms of systolic blood pressure (4 subjects compared with 19 subjects in the group with the high suboptimal status value (x^2=14.487; p<0.001)) and diastolic blood pressure (1 subject with the suboptimal status value less than 13 points and 31 subjects with the suboptimal status value higher than 13 points (x^2=38.727; p<0.001)). The level of anxiety in the group with the high suboptimal status value was elevated significantly more often than in the group with the low suboptimal status (27 subjects versus 18 subjects, respectively; x^2=4.869; p=0.028). The groups of physical activity were significantly different in terms of the suboptimal status value: 16 subjects in group 2 had a low suboptimal status value, 25 subjects had a high value (x^2=4.956; p=0.026); 28 subjects in group 3 had a low suboptimal status value, 44 subjects had a high value (x^2=9.833; p=0.002); 32 subjects in group 6 had

Table 3. *Comparative analysis of noncommunicable diseases risk factors studied in groups with high and low values of suboptimal health status by average values of studied indices*

Index	SHS Mean + Std (≤13) n=194, (Me(IQR))	High score SHS Mean + Std (> 13) n=157, (Me(IQR))	Reliability
Men	38 (27.0–50.5)	43 (33.5–54.0)	U=0.0; z=0.0; p=1.0
Women	37 (25.0–46.0)	48 (35.5–55.5)	U=6.0; z=0.0; p=1.0
Mean age	38.6 (19–75)	45.04 (18–75)	**z=4.104009; p=0.000041***
Blood pressure	118.6 (110–120)	123.8 (112.5–130)	U=0.0; z=0.0; p=1.0
Body weight	92.6 (67.1–120.1)	89.3 (70.3–103.6)	U=0.0; z=0.0; p=1.0
Total cholesterol	4.4 (4.4–5.4)	4.4 (4.4–5.2)	U=0.0; z=0.0; p=1.0
Level of anxiety	3.6(2.5–7.5)	8.7 (6.7–11.7)	**z=4.00034; p=0.028***
Level of depression	8.7 (6.5–11.5)	8.3 (6.1–11.0)	U=0.0; z=0.0; p=1.0

Note: * results with p<0.05 are indicated **in bold**

Table 4. *The comparative analysis of noncommunicable diseases risk factors studied in groups with a high and low suboptimal health status value*

Index	SHS Mean + Std (≤13) n=194, (Me(IQR))	High score SHS Mean + Std (> 13) n=157, (Me(IQR))	Reliability
Men aged over 45 years	26	21	**x^2=6.309; ρ=0.013***
Women aged over 45 years	35	57	**x^2=4.324; ρ=0.038**
Patients with high systolic blood pressure	4 subjects	19 subjects	**x^2=14.487; ρ<0.001**
Patients with high diastolic blood pressure	1 subject	31 subjects	**x^2=38.727; ρ<0.001**
Overweight	103 subjects	95 subjects	x^2=1.941; ρ=0.164
Smoking	7 subjects	6 subjects	x^2=0.011; ρ=0.917
The use of alcohol equivalent to > 30 (20) ml of ethanol	50 subjects	42 subjects	x^2=0.043; ρ=0.836
Hypercholesterolemia (cholesterol level more than 5.0 mmol/L)	65	51	x^2=0.041; ρ=0.840
High anxiety level (above 7 points)	18	27	**x^2=4.869; ρ=0.028**
High depression level (above 7 points)	16	16	x^2=0.396; ρ=0.053
Physical activity			
group 1	30	28	x^2=0.354; ρ=0.553
group 2	16	25	**x^2=4.956; ρ=0.026**
group 3	28	44	**x^2=9.833; ρ=0.002**
group 4	40	27	x^2=0.658; ρ=0.418
group 5	9	10	x^2=0.507; ρ=0.477
group 6	32	5	**x^2=16.302; ρ<0.001**
group 7	13	2	**x^2=6.248; ρ=0.013**
group 8	26	16	x^2=0.849; ρ=0.357

Note: * results with ρ<0.05 are indicated **in bold**

a low suboptimal status value, 5 subjects had a high value (x^2=16.302; ρ<0.001); 13 subjects in group 7 had a low suboptimal status value, 2 subjects had a high value (x^2=6.248; ρ=0.013) (Table 4).

Results and Discussion

Patients with different levels of physical activity enrolled in the study were comparable on the main clinical parameters. Actual values of the studied parameters were practically the same. However, based on the risk factors for noncommunicable diseases, these groups showed significant differences in terms of the suboptimal status value.

When studying actual values, significant differences between the groups were revealed for some parameters: high blood pressure in groups 3 and 4 of physical activity; overweight in groups 2, 3, 5 and 8 of physical activity; and women's age was significantly different between the groups. This proves the relationship between the presence of risk factors and the level of physical activity of the patient. The data obtained are consistent with the published data on the results of international studies, studies in Russia, and randomized

clinical trials [2, 4, 5, 6, 9, 10, 11, 14, 15], which also showed significant differences in these parameters. Significant differences were revealed in the actual mean age and the level of anxiety between groups with high and low suboptimal status values.

When analyzing the groups of physical activity by the risk factors for noncommunicable diseases, significant differences in the suboptimal status value were revealed, which reflected the presence of these risk factors in groups with different physical activity (women aged over 45 years, overweight, monthly alcohol consumption, hypercholesterolemia and high level of depression). There were significant differences between groups with high and low suboptimal status values in the presence of risk factors for noncommunicable diseases: age over 45 years, high systolic and diastolic blood pressure, a high level of anxiety. The groups with low and high physical activity were significantly different in terms of the suboptimal status value (groups 2, 3, 6 and 7).

Conclusion

In the groups of patients who consider themselves healthy and do not seek medical attention for 3 months or more, risk factors for noncommunicable diseases are identified, which are more frequent in the groups of patients with low physical activity. Differences in the suboptimal health status values were revealed when the risk factors for noncommunicable diseases were present. The assessment of the suboptimal health status using the SHSQ-25 questionnaire [Yu- Xiang, Yan. 2009] is performed both on the sum of points of the questionnaire, and on its 5 individual scales: "cardiovascular system", "digestion", "immunity", "mental status", and "fatigue". This questionnaire is easy to use in primary health care, and it is a cheap and effective tool for screening subclinical, reversible stages of chronic diseases. The novelty of the studies on exploring the suboptimal health status in patients with different levels of physical activity as a risk factor of noncommunicable diseases has not been evaluated and the data we obtained are of interest for further scientific research.

The results of the study are recommended to be taken into account in the practice of primary health care. Scientific research on the use of the SHSQ-25 questionnaire should be continued.

Summary

1. Risk factors for noncommunicable diseases were often present in the groups of patients who consider themselves healthy and do not seek medical attention for 3 months or more.

2. The differences in the suboptimal health status value have been revealed in patients who had different levels of physical activity and risk factors for noncommunicable diseases.

3. Significant differences in the risk factors for noncommunicable diseases have been revealed in patients with different suboptimal status values.

4. The data obtained show that the determination of the suboptimal health status value is of particular importance in identifying early stages of the development of noncommunicable diseases.

Acknowledgments

The authors express gratitude to the general practitioners of the medical institutions of the Samara region for assistance in the preparation of this article: Aleksandrova S.N., Bezvitel'nov S.V., Bormotova N.V., Vasjutkin N.A., Galitskiy D.E., Grafcheva S.A., Zhurilenko V.I., Zheleznikov S.A., Ivanova O.V., Il'ina G.F., Kartashev I.E., Karpunina I.E., Kostina T.S., Kononova O.A., Kovaleva L.Ju., Kudrjashova Z.S., Lavrent'eva I.I., Latysh E.V., Loginova L.A., Lezhen' N.K., Lanovenko L.S., Migacheva L.S., Pavlova O. Ju., Solina E.V., Sedova I.A., Tumanina V.P., Hivintseva O.A., Holomejdo Ju.A., Chaplagina N.R., Shchepkina I.M., Avdeeva T.A., Akulov D.A., Alkurdi M.A., Apanasik L.V., Babaev O.O., Valov E.S., Vinogradova N.V., Vladimirova N.V., Vorob'ev S.I., Gorohova I.V., Evlahova I.B., Ermakova E.V., Zhegalina I.N., Zakoljukina O.V., Kameneva N.A., Kashtanova N.V., Knjazeva I.A., Kovaleva E.Ju., Kozlova E.V., Kostrikina T.V., Lopatina N.S., Majstrishina L.Sh., Muhranova O.S., Novikova V.S., Novoselova N.F., Patrusheva Z.A., Rudakova T.P., Sal'nikov A.P., Sivtsova N.P., Suprunov A.I., Trostjanskiy B.V., Tsymbalistaya V.N., Juritsin N.S.

Conflict of interests
The authors declare no conflict of interests.

References:

1. The global action plan for the prevention and control of noncommunicable diseases 2013-2020 — URL: 2013/who.int/cardiovascular_diseases/15032013_updated_revised_draft_action_plan_russian.
2. Danilova E.S., Potemkina R.A., Popovich M.V. The process of implementation of regional programs of prevention of non-communicable diseases: two-year results. Profilakticheskaja medicina. 2015; 18(4): 17–22 [In Russian].
3. Wei Wang, Yu-Xiang Yan. Suboptimal Health: a new health dimension for translational medicine. Clinical and translational medicine. 2012; 1(28): 2–6.
4. Bojcov S.A., Oganov R.G., Maslennikova G.Ja. et al. Comprehensive programme for the prevention of non-communicable diseases: planning, implementation, and assessment. Profilakticheskaja medicina. 2012; 15(suppl. 1): 3-18 [In Russian].
5. Lazebnik L.B., Il'chenko L.Ju. Age-related changes in the liver (clinical and morphological aspects). Klinicheskaja gerontologija. 2007; 13(1): 3–8 [In Russian].
6. Stel'mah V.V., Kozlov V.K. Metabolic correction of dyslipidemia in patients with non-alcoholic fatty liver disease as a new treatment strategy. Ter. arhiv. 2013; 4: 71–76 [In Russian].
7. Yan Y.X., Liu Y.Q., Li M., Hu P.F., Guo A.M., Yang X.H., Qiu J.J., Yang S.S., Wang W. Development and evaluation of a questionnaire for measuring suboptimal health status in urban Chinese. J. Epideml. 2009; 19(6): 333–341.
8. Marutina E.Yu. The identification of predictors of hypertension in the urban population through an assessment of the suboptimal health status: avtoref. dis. cand. med. sciences. Samara. 2016; 20 p. [In Russian].
9. Potemkina R.A. Physical activity and nutrition. A guide for doctors. M.: "GEOTAR-Media". 2010; 96 p. [In Russian].
10. Azizova I.A. Problems of elderly men in general medical practice: primary screening. Aspirantskie chteniya. 2002. Abstracts of the inter-regional conference of young researchers. Samara: SamGMU. 2002: 14–15 [In Russian].
11. Makarova A.V. The relevance of screening studies and a non-invasive method for determining endothelial dysfunction in the preventive work of a specialized consultative and diagnostic center. Aspirantskie chteniya-2017: Materials of the scientific-practical conference with international participation. "Scientific achievements of young scientists of the XXI century in the framework of the priority directions of the strategy of scientific and technological development of the country" [Editors: G.P. Kotel'nikov, Yu.V. Shchukin, I.L. Davydkin et al.]. Samara: OOO "Ofort". 2017; 262 p. [In Russian].
12. Potemkina R.A., Boytsov S.A. Exercise in medicine in Russia. Schweizerische Zeitschrift fur Sportmedizin und Sport traumatologie. 2014; 62(2): 35–37.
13. Healthier Food Retail: Beginning the Assessment Process in Your State or Community. National Center for Chronic Disease Prevention and Health Promotion. Available at: http://www.cdc.gov/obesity/downloads/HFRassessment.pdf. Accessed March 26, 2018.
14. Il'chenko L.Ju. Influence of dosed physical load on functional and hemodynamic parameters in patients with chronic diffuse liver diseases: diss. Candidate of Medical Sciences. M. 1990 [In Russian].
15. Zaplutanov V.A., Spikina A.A., Belov V.G. et al. Age-specific metabolic therapy of alcohol dependence in elderly patients, taking into account their acmeological features. Uspehi gerontol. 2015; 2: 374–380 [In Russian].

Article received on 23.05.2018
Accepted for publication on 09.07.2018