

Drapkina O. M.<sup>1</sup>, Begrambekova Yu. L.<sup>1</sup>, Orlov D. O.<sup>1</sup>, Shepel R. N.<sup>2,3</sup>, Samoilov T. V.<sup>1</sup>

<sup>1</sup> National Medical Research Center for Therapy and Preventive Medicine, Moscow, Russia

<sup>2</sup> Medical Research and Educational Center, Lomonosov Moscow State University, Moscow, Russia

<sup>3</sup> School of Fundamental Medicine, Lomonosov Moscow State University, Moscow, Russia

## DETERMINATION OF FACTORS INFLUENCING THE DESIRE AND POSSIBILITIES OF PREVENTION OF INACTIVITY AND OTHER BEHAVIORAL RISK FACTORS BY PRIMARY CARE PHYSICIANS (REFLECTION). THE RESULTS OF A ONE-TIME SURVEY

<i>Aim</i>	To evaluate clinical practice of primary care physicians with respect of preventing behavioral risk factors in patients as well as objective and subjective factors that influence their motivation for taking preventive measures.
<i>Materials and methods</i>	This study was a cross-sectional survey. The questionnaire was anonymous and included closed questions and multiple-choice questions. Based on the obtained results, prevalence of modifiable risk factors for chronic noninfectious diseases (CNID) was comprehensively evaluated in the survey population. Also, a special quantitative variable was introduced, the Index of Behavioral Risk Factors, that reflected the burden of risk factors. This composite index included the degree of risk factor in a specific respondent, for example, obesity degree, number of cigarettes smoked per day, severity of hypodynamia. Physicians' knowledge and beliefs about the effect of physical activity (PA) on certain diseases were evaluated.
<i>Result</i>	623 physicians (mean age 40 years (31-52), 85.5% women) participated in the survey. The respondents included general practitioners (7.5%), cardiologists (2.9%), preventive care physicians (4.8%), internists (25.4%), and other specialists (59.4%). 70.8% of respondents never smoked, 17.5% were current smokers. 38.5% (240) of the surveyed had a normal body weight index (BWI); 41.7% (260) were overweight; 11.6% (72) had degree 1 obesity; 3.7% (23) had degree 2 obesity; and 0.8% had degree 3 obesity. A very low PA level was noticed; most of the surveyed exercised not more than once a week (median, 1 (0-3) time). More than 90% had behavioral risk factors, low PA and excessive body weight. The physicians with a higher index of behavioral risk factors 50% less frequently checked the body weight of patients (odds ratio (OR), 0.541; 95% confidence interval (CI): 0.388–0.753, $p < 0.05$ ); 33% less frequently asked whether the patient smoked (OR, 0.675; 95% CI: 0.465–0.978, $p = 0.037$ ); 50% less frequently asked the patients about his/her level of PA (OR, 0.482; 95% CI: 0.343–0.678, $p < 0.001$ ); and 60% less frequently recommended increasing the PA (OR, 0.408; 95% CI: 0.292–0.570, $p < 0.001$ ).
<i>Conclusion</i>	Most of the surveyed were aware of the benefits of PA for prevention and treatment of CNID, however, they related the mechanism of this effect only with weight loss. The most frequently mentioned barriers to behavioral risk counseling were uncertainty about whether such counseling was within the physician's professional competence, lack of time, lack of confidence in the provision of advice and the effectiveness of interventions, and lack of patients' compliance.
<i>Keywords</i>	Risk factors; CNID; physical activity; exercise; BWI
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<i>Corresponding author</i>	Orlov D. O. E-mail: rizhiy17@mail.ru

### Introduction

Chronic noncommunicable diseases (NCDs), such as cardiovascular diseases (CVDs), malignancies,

diabetes mellitus (DM), chronic lung diseases, are the leading cause of death and disability worldwide [1]. Unhealthy lifestyles play a key role in the pathogenesis

of CNCDs [2]. The ESSE-RF study allowed evaluating the prevalence of risk factors in the Russian regions. The prevalence of smoking was found to be 23.5%, and alcohol consumption is moderate (73.2%), alcohol abuse accounted to 3.8%. Low physical activity (PA) was reported in 38.8% of cases, more among female patients than male patients (40.8% and 36.1%, respectively). Intake of vegetables and fruits was inadequate in 41.9% of subjects; 36.9% of Russians do not consume enough fish, and 49.9% of subjects eat too much salt [3].

It is necessary to prevent behavioral risk factors (smoking, sedentary lifestyle, lack of PA, unbalanced nutrition) to reduce the personal and social consequences of CNCDs [4]. Due to frequent patient contacts, which is a reliable source of information and an opportunity to intervene with patients who are at risk and in the early stages of disease, primary care physicians have the best potential for detecting and modifying risk factors [4–6]. It has been shown that internists and general practitioners can persuade patients to quit smoking [5, 6], increase PA [7], and lose weight [8].

However, both Russian and foreign studies have repeatedly demonstrated insufficient control of behavioral risk factors by physicians, even in case of high cardiovascular risk. In the EUROASPIRE V study, among patients with coronary artery disease (CAD), 18.1% were smokers, 43.5% were obese (body mass index  $\geq 30$  kg/m<sup>2</sup>), and 63.8% had central obesity (waist circumference 88 cm in female patients, 102 cm in male patients), and the target levels of blood pressure (BP) and low-density lipoprotein (LDL) cholesterol were achieved by 47% and 46.9% of patients, respectively. [9].

The Women Physicians' Health Study (WPHS, 1972, n=4,501) produced the first evidence of a relation between a physician's PA level and his/her professional behavior in terms of advising patients on PA [10]. According to the survey, physicians who trained and reached the WHO recommended level of PA advised training to their patients more often. Since then, more relevant evidence has been produced [11–13]. Similar trends have been observed for other aspects of healthy lifestyles [14]. In general, it can be said that leading a healthy lifestyle and having a self-aware attitude about his/her health ensures that a physician has proactive approach to the prevention of risk factors and a high level of adherence to recommendations concerning NCD prevention. McKenna et al. (1998) showed that general practitioners were more likely to recommend exercising to patients if they worked out regularly (odds

ratio (OR) =3.19; 95% confidence interval (CI): 1.96–5.18). They identified lack of time (OR=0.73; 95% CI: 0.58–0.93) and lack of motivation (OR=0.74, 95% CI: 0.59–0.94) as the main restraints for recommending PA [15].

Interestingly, physician's resting heart rate, which is a measure of fitness (OR=3.45; 95% CI 1.46–8.18), and lack of physician's confidence in the importance of PA for maintaining health (OR=4.86; 95% CI: 1.70–13.91), were independent predictors of insufficient advice in improving PA in the study Sherman et al. (1993) [12]. In the Russian study by Kobyakova et al. (2019), the prevalence of the following risk factors for cardiovascular diseases was evaluated in 1,668 physicians: smoking (15.1%), alcohol abuse (11.2%), malnutrition (67.6%), hypodynamy (45.7%), overweight (34.7%), dyslipoproteidemia (27.3%), hyperglycemia (1.6%), increased BP (5.6%) [16]. In the study conducted among more than 17,000 Canadian physicians (2019), the prevalence of smoking, hypertension, dyslipoproteidemia, and diabetes mellitus was 13.1%, 16.9%, 13.3%, and 5.0%, respectively [17].

The results of Russian studies show that the morbidity among health professionals is even higher than in the general population, and the health indicators of nurses are lower than those of physicians [18, 19]. It should be noted that adherence to a healthy lifestyle and professional interest in primary prevention measures are built up during training. In the study of medical students, similar relations «healthy physician=healthy patient» were unraveled. Consumption of 5 or more servings of fruits and/or vegetables per day, cessation of smoking or alcohol abuse, taking into account sex and factors related to medical education, were associated with a positive attitude to advice on nutrition (OR 4.71; 95% CI: 1.6–14.1, p=0.006), smoking (OR 2.62, 95% CI: 1.1–5.9, p=0.022), and alcohol consumption (OR 2.61, 95% CI: 1.3–5.4; p<0.009), respectively [20]. In a study comparing physicians' and students' adherence to healthy lifestyles, which was conducted during the cardiac congress in Yekaterinburg in 2016, physicians were found to eat vegetables/fruits and fish significantly more often (p<0.05), consume too much salt comparatively more often, and be less physically active than students [19].

According to the systematic reviews, some physicians think that: (a) patients may not want or need any interventions to change their behavior; and (b) patients lack the drive and desire to change health-related behaviors [21, 22]. Thus, physicians sometimes make decisions about whether or not to interfere with

patients' lifestyles, based on their prejudicial attitudes toward particular patient groups, their perceptions of the patient's personal risk, and the expected degree of adherence to the physician's advice [6, 9, 14].

Our study was conducted to examine the profile of physician's risk factors, knowledge and beliefs on the prevention of CNCs, and understand how these factors affect physician's behavior regarding the prevention of CNCs in real-world clinical practice.

## Objective

Assess the clinical practice of primary care physicians in terms of the prevention of behavioral risk factors in patients and objective and subjective factors that affect their motivation to carry out preventive measures.

## Material and methods

### *Recruitment of respondents in the study*

Respondents were recruited under technical support of chief extraordinary experts in internal medicine of the Russian federal subjects and districts. The survey was conducted in the official website of the Russian Society for the Prevention of Noncommunicable Diseases (<https://ropniz.ru/scienceresearches/reflection>). There was a total of 623 responses. The survey was anonymous and included closed and multiple-choice questions. The introduction section of the survey included questions about personal data (sex, age, weight, height, specialty and place of work, smoking status, level of physical activity). The prevalence of modified risk factors for chronic noncommunicable diseases (CNCs) was assessed comprehensively in the survey population based on the obtained results. Special behavioral risk factors index was introduced to quantify the weight of risk factors. The Behavioral Risk Factors Index system was developed to assess the burden of behavioral risk factors. The system is based on the analysis of the following factors: smoking behavior (smoking more than 20 cigarettes/day – 4 points, less than 20 cigarettes/day – 3 points, occasional smoking – 2 points, quit smoking – 1 point, never smoked – 0 points), achievement of the WHO recommended levels of PA (number of trainings per week lasting 30 minutes or more: 0–4 points; 1–2–3 points; 3–1 point, 4 and more – 0 points) and body mass index (BMI) (BMI<18.5–1 point; BMI ≥18.5 and <25–0 points; BMI ≥25 and <30–1 point; BMI ≥30 and <35–2 points; BMI ≥35 and <40–3 points; BMI ≥ 40–4 points). A total of 0 points means the absence of behavioral risk factors and 10 points corresponds to the maximum number of behavioral risk factors.

Corresponding multiple-choice questions were used to assess physicians' perceptions of the benefits of physical activity. The second set of questions was about the professional activities of respondents regarding the identification and prevention of behavioral risk factors in patients.

### *Statistical analysis*

The data obtained were processed using StatTech v. 2.1.0 (OOO «Stattech», Russia).

The compliance of quantitative indicators with the normal distribution was estimated using the Kolmogorov–Smirnov test. Non-normally distributed quantitative data were described using the median (Me) and the lower and upper quartiles (Q1–Q3). The categorical data were expressed by the absolute values and percentages. Pearson's chi-squared test was used to compare absolute values in the analysis of multifactor contingency tables. Two groups were compared by a non-normally distributed quantitative indicator using the Mann–Whitney U-test. Three or more groups were compared by a non-normally distributed quantitative indicator using the Kruskal–Wallis test, and post-hoc comparisons were performed using the Dunn test with Holm adjustment. Odds ratio (OR) and 95% confidence interval (CI) were calculated to determine the behavioral risk factors of respondents that influence physician's advice concerning behavioral risk factors. The ROC curve analysis was conducted to estimate the diagnostic significance of quantitative indicators when predicting a certain parameter. The cut-off value of the quantitative sign was determined by the highest value of the Youden index. The values of  $p < 0.05$  were considered significant in all types of analyses. The level of significance is two-tailed.

## Results

The survey included 623 physicians with the mean age of 40 (31–52) years, 85.5% were female. Among respondents, there were 7.5% of general practitioners, 2.9% of cardiologists, 4.8% physicians of the medical prevention office / department, 25.4% of internists, and 59.4% of physicians of other specialties. More than 90% of respondents were employed in primary health care. 70.8% of respondents never smoked, 11.7% gave up smoking, 17.5% are smokers, of whom 1.9% smoke more than 20 cigarettes a day. BMI was normal in 38.5% of respondents ( $n=240$ ), 41.7% ( $n=260$ ) were overweight, 11.6% ( $n=72$ ) had grade I obesity, 3.7% ( $n=23$ ) had grade II obesity, 0.8% ( $n=5$ ) had grade III obesity, and 3.7% ( $n=23$ ) were underweight. We also asked the respondents' opinions about their weight.



We found out that some respondents assessed their weight inadequately according to the approved BMI classification (Figure 1).

Statistically significant differences ( $p < 0.001$ ) were found between the self-assessment of body weight in persons with normal weight (according to BMI) and persons with overweight and grade I obesity, when the groups were compared by the body mass index depending on the indicator «How do you describe your current weight?» based on the data obtained. Respondents with normal weight (75.3%) and morbid obesity assessed their weight adequately more often. Overweight respondents (61%) very rare evaluated their weight correctly.

Moreover, we asked how many times in the previous seven days respondents had intense training lasting for at least 30 minutes. The median number of days was 1 (0–3), which is an unacceptably low level of compliance by physicians with the WHO recommended level of PA (150–300 minutes per week). The physician's motivation for recommending PA is largely influenced by his/her opinion on the role of PA in maintaining health. We offered respondents a few statements about the benefits of PA for health.

The distribution of responses is presented in Table 1.

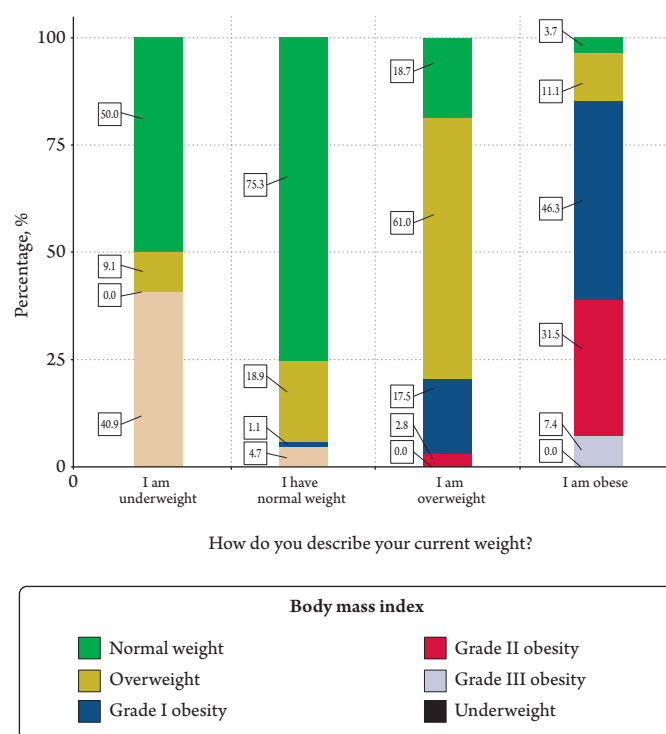
The questions about the relation of low PA and malignancies and the mechanism of influence of PA on the prevention of CNCs were most embarrassing for the respondents. Only 62.8% and 58.7% of physicians, respectively, gave correct answers to those questions.

The analysis of the survey results showed a difference in the likelihood of recommendations concerning behavioral risk factors depending on the age of respondents. For example, respondents of 49 years and older chose the answer «often and always» to the question «How often do you ask the patient about the level of his/her physical activity?» more often (area under the ROC-curve  $0.577 \pm 0.024$ , 95% CI: 0.531–0.623). The constructed model was statistically significant ( $p = 0.002$ ; Figure 2 and Figure 3).

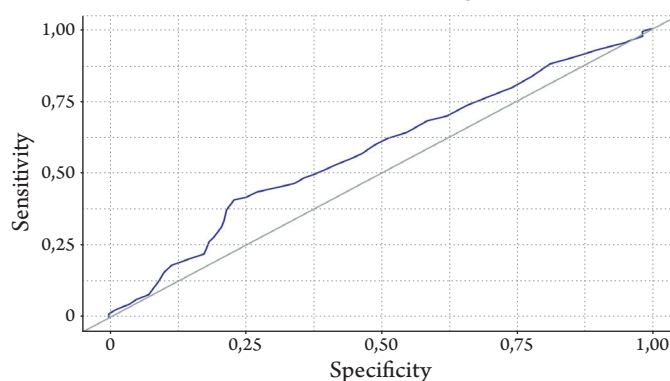
Similar data were obtained for the question «How often do you recommend physical activity to your patients?». Area under the ROC curve was  $0.579 \pm 0.023$ , 95% CI: 0.534–0.624. The constructed model was statistically significant ( $p < 0.001$ ; Figure 4).

The age cut-off at the highest value of the Youden index was 37 years (Figure 5). However, the sensitivity and specificity of the models were low in both cases: 40.9% and 77.0%, respectively, in the first case and 64.2% and 49.6% in the second case.

**Figure 1.** Analysis of answers to the question «How do you describe your current weight?» depending on body mass index



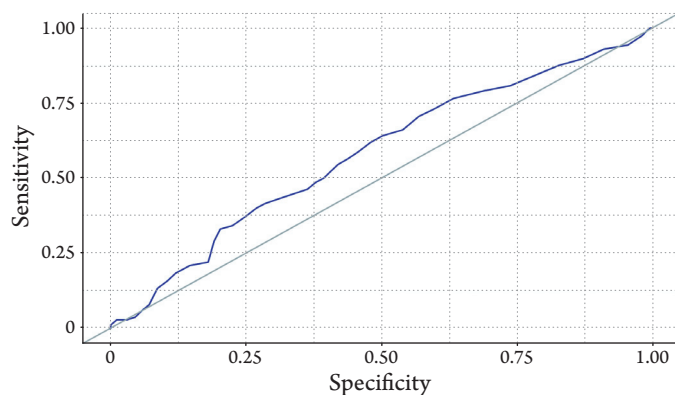
**Figure 2.** ROC-curve that characterizes the dependence of the probability of answers «often and always» to the question «How often do you ask the patient about the level of his/her physical activity?» on age



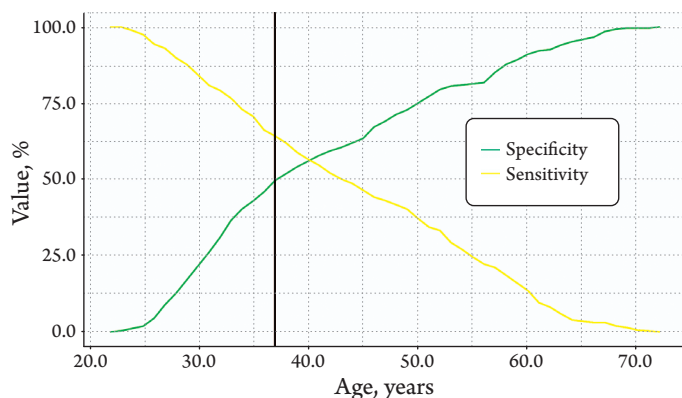
**Figure 3.** Analysis of sensitivity and specificity of the model depending on the age thresholds



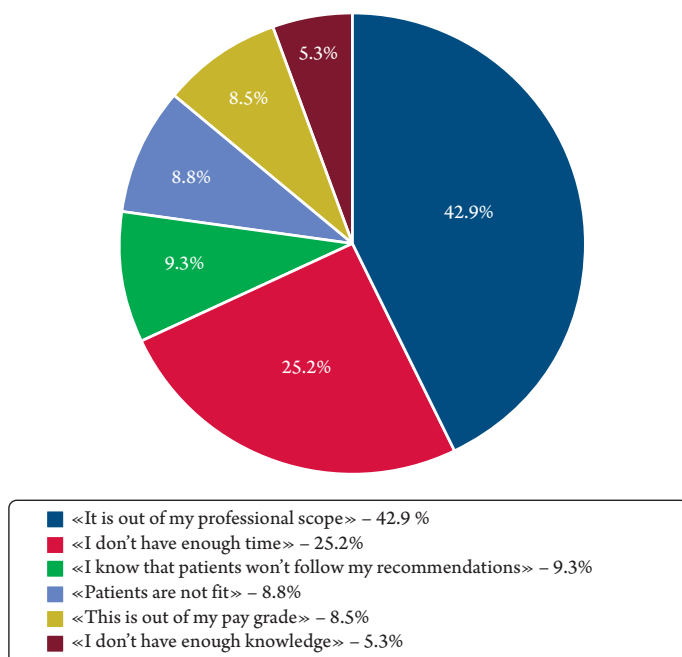
**Figure 4.** ROC-curve that characterizes the dependence of the probability of answers «often and always» to the question «How often do you recommend physical activity to your patients?» on age



**Figure 5.** Analysis of sensitivity and specificity of the model depending on the age thresholds



**Figure 6.** Distribution of answers to the question «Why don't you give advice to patients on physical activity?»



There was no evidence that the respondents' specialties had an effect on their knowledge of the health impacts of PA.

377 physicians answered the questions on why they were unable or unwilling to advice patients on PA (Figure 6). The most frequent answer was «It is out of my professional scope», which could be partly explained by the fact that approximately half of the respondents were not cardiologists, internists, preventive care specialist, or general practitioners. Another 25% of the respondents stated that they did not have time. It should be noted that more than 20% of responses

**Table 1.** Distribution of answers to questions about physical activity

Parameters	Category	n	%
PA reduces cardiovascular risk	Strongly disagree	1	0.2
	Disagree	7	1.1
	In-between	25	4.0
	Agree	185	29.7
	Strongly agree	405	65.0
PA is an effective treatment of depression	Strongly disagree	1	0.2
	Disagree	8	1.3
	In-between	53	8.5
	Agree	235	37.7
	Strongly agree	326	52.3
PA is a treatment for diabetes mellitus	Strongly disagree	6	1.0
	Disagree	51	8.2
	In-between	135	21.7
	Agree	210	33.7
	Strongly agree	221	35.5
Weight loss is the only health benefit provided by PA	Strongly agree	79	12.7
	Agree	65	10.4
	In-between	113	18.1
	Disagree	288	46.2
	Strongly disagree	78	12.5
Adults who do enough PA have a lower risk of some cancers than sedentary adults	Strongly disagree	16	2.6
	Disagree	82	13.2
	In-between	134	21.5
	Agree	191	30.7
	Strongly agree	200	32.1

were related to physicians' subjective interpretation of patients' desires and capabilities, which was based on physicians' own lack of understanding of the health benefits and importance of PA (responses: «patients will not follow the recommendations» and «the state of patient's health does not allow»).

The high level of behavioral risk factors in the survey population indirectly confirms the above. Only 6.8% of physicians had no behavioral risk factors (Figure 7). The Behavioral Risk Factors Index score was mainly determined by low PA and overweight.

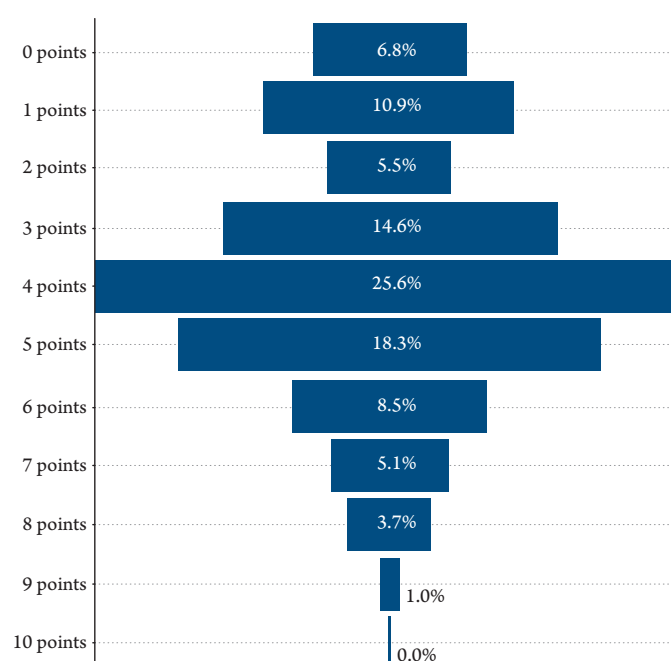
There was a substantial relationship between the number and severity of behavioral risk factors in respondents and their conduct when it came to identifying and preventing modifiable NCD risk factors in patients.

The responses showed that physicians with the behavioral risk factor index of 5–9 were 2 times less likely to measure patient's weight (OR=0.541; 95% CI: 0.388–0.753;  $p<0.05$ ), asked whether patient smoked 1.5 times less frequently (OR=0.675; 95% CI: 0.465–0.978;  $p<0.037$ ), clarified the level of patient's PA 2 times less often (OR=0.482; 95% CI: 0.343–0.678,  $p<0.001$ ), and give actual recommendations to increase PA 2.5 times less frequently (OR=0.408; 95% CI: 0.292–0.570;  $p<0.001$ ).

## Discussion

Our study established that primary care physicians face numerous barriers to advising on behavioral risk factors, particularly PA. These barriers include lack of time, knowledge, patient education materials and corresponding protocols, lack of other essential resources, such as infrastructure and financing. One of the main reasons for lack of advice on PA is that, despite clear evidence that low PA plays a key role in the development and progression of most CNCs, there is no clear position in the medical community, including both experts and clinicians, on PA and exercise as the primary methods of preventing CNCs and important methods of treating them. According to a Russian study of the enrollment of patients with heart failure in cardiac rehabilitation programs, only 55% of patients were aware that exercise can be used to treat heart failure, and only 50% of them received this information from a physician. [23]. According to our findings and data of some other studies, there is a definite association between the physician's choice of healthy lifestyle and his/her engagement in the maintenance of patients' healthy lifestyles [11, 24]. The overwhelming majority of our respondents had more than one risk

**Figure 7. Distribution of the Behavioral Risk Factors Index scores**



factors and nearly 100% of them did not follow the WHO recommendations on PA. Physicians generally tended to agree with the evidence of health benefits of PA, with the highest confidence in the effects on CVDs and depression and the lowest confidence in the effects on DM (30% of respondents were unsure), and only 63% of respondents knew that physically active adults had a lower risk of developing certain cancers. There is reason to say that a significant percentage of respondents did not understand how PA impacts the health: 23% of respondents believed that the only benefit of PA was weight loss, and another 18% did not know the correct answer to this question. The lack awareness of the physiological mechanisms of the physiological mechanisms of the PA influence on human health, in our opinion, is one of the major reasons for inadequate advising of patients on PA by physicians. More research in this area should contribute to finding ways to increase physicians' motivation to maintaining healthy lifestyles.

## Conclusion

Primary care physicians of various specialties have high behavioral risk factors, such as low PA and overweight. Physicians with more behavioral risk factors of higher severity are less likely to identify and modify behavioral risk factors in their patients. Although the majority of respondents are aware of the benefits of AP for the prevention and treatment of CNCs, they associate a specific mechanism of



action only with weight loss. The most common barriers to advising on behavioral risk factors were uncertainty that such advice is within the physician's professional competence, lack of time, lack of confidence in the provision of advice and efficacy of

interventions, and lack of patient's compliance or motivation.

*No conflict of interest is reported.*

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