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Gender differences and trends of attitude toward smoking and diet behavior in population aged 25-64 years from 1988 to 2017

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Abstract

The aim: *To determine gender differences in the dynamic of attitude toward smoking and diet behavior in an open population of 25-64 years over a long-term period - 29 years in Russia / Siberia (Novosibirsk).*

Methods: *Within the framework of the screening in 1988-89 under the WHO MONICA-psychosocial (MOPSY) program (n=1676, 49.5% males, mean age 44.1±0.4 years), MOPSY screening in 1994-95 (n=1527, 43% males, mean age 44.85 ± 0.4 years), in 2003-2005 under the international project HAPIEE (n=1650, 34.9% males, mean age 54.25±0.2 years), in 2013-2016 (n=975, 43.8% males, mean age 34.5±0,4 years) and 2016-2017 (n=663, 41.3% years 51.95±0.32 years) within the framework of the budgetary theme No. AAAA-A17-117112850280-2, random representative samples of men and women in one of districts in Novosibirsk were examined. Smoking status and diet behavior assessed by questionnaire proposed by MONICA-MOPSY protocol.*

Results: *The proportion of men who ever smoked was extremely high (80%) in the general population of 25-64 years and remained unchanged in the period 1988-2003 but began to decrease in 2013, first in the younger age groups and in 2016-2017 in the older age groups. Despite the fact that there are significantly fewer female smokers, the proportion of female smokers began to increase in 1994, firstly in younger age groups and by 2003-05 in older age groups. Men of younger age groups more often than women tried unsuccessfully to give up a harmful habit. But in 2013-2016, the proportion of those who quit smoking increased to 25-29%. Men were 1.5-2 times more likely than women to report that they did not need to follow a diet. The number of those adhering to the diet, despite the increase in 2013-17, on average did not exceed 10% during 29 years of observation. Diet men were absent in the younger age group in 1988; but in the 45-54 age group their number reached a maximum of 17.1% in 2016-17, overtaking women in this indicator. The proportion of unsuccessful dietary attempts was higher among women in all age groups. The gender gap in the frequency of failed attempts to follow a diet has been growing since 2003. And in 2013-16, more than half of the male and 2/3 of the female population were unsuccessful in trying to adhere to the diet.*

Conclusions: *There was a trend towards a decrease in smoking among men and, at the same time, a decrease in the proportion of women who never smoked in the period from 1994 to 2017. More than half of the male population and 2/3 of the female population were unsuccessful in trying to adhere to the diet, so the proportion of those following the diet did not exceed 10% during 29 years of observation.*

Keywords: Gender, Trends, Smoking, Diet, Lifestyle, Behavior

Introduction

Smoking and diet are well-known factors affecting public health. The high commitment of the Mediterranean population to a healthy lifestyle showed a significantly lower risk of mortality from all causes, which underlines the importance of adhering to healthy lifestyle habits [1]. In this 20-year follow-up of a large number of participants (n = 22,790), it was found that in never-smokers, behavioral characteristics were individually associated with a

decrease in mortality risk. It should be noted that the strategy of combining protective behavioral characteristics is much more beneficial for health and potentially increases life expectancy [2, 3]. For 3 decades, most countries in the world have shown a decline in smoking prevalence. On average, the proportion of smokers among men decreased from 41% to 31%, among women from 11% to 6% in the period 1980-2012 [4]. In high-income countries, the proportion of men and women who smoke is equalized: 20% and 19%, respectively [5]. It is known that women smoke less than men, both qualitatively and quantitatively. Women start smoking later than men and the gender ratio of smokers varies in different age categories [6]. At the same time, women more often report their intention to quit smoking but have fewer successful attempts [7].

Sex differences in eating behavior are reflected in the higher consumption of vegetables, fruits, legumes but also sugary saturated foods among women. Men prefer foods rich in fat and protein which may reduce the risk of obesity [8, 9]. Motivation and awareness are other aspects that influence eating behavior. Women are showing greater awareness of the role of nutrition in human health and a willingness to adopt a healthier diet. They are particularly worried about their own body image, of which they are generally unsatisfied. But women have been demonstrated to give up and abandon the new dietary plan more frequently than men [8]. Several studies have shown minimal gender differences between eating behavior and outcomes. The authors explain this by the general low adherence to a healthy diet among the population [10].

Our research complements these prior scientific reports. Evaluating a large number of people from the general population participating in screening over the years but with a common design, increases the generalizability and relevance required for epidemiological protocols based on research principles. Thus, the aim of our study was to explore gender differences in the dynamics of attitude toward smoking and diet behavior in population aged of 25-64 years over a long-term period - 29 years.

Methods

The results of our study were obtained on the basis of a survey of the male and female population living in one of the districts of Novosibirsk. The examinations were carried out within the framework of screenings 1988-89, 1994-95, 2003-2005, 2013-2016 and 2016-2017.

Under the II screening of the WHO program «Multinational Monitoring of Trends and Determinants of Cardiovascular Disease - Optional Psychosocial Sybstudy» (MONICA-MOPSY) representative sample of residents aged 25–64 years was examined in 1988-1989 (n=1676, 49.5% males, mean age 44.1±0.4 years, response rate - 69.8%) [11].

In frame of MOPSY screening in 1994-1995 representative sample of residents aged 25–64 years was examined (n=1527, 43% males, mean age − 44.85±0.4 years, response rate – 77.3%).

In the course of another international project HAPIEE (Health, Alcohol and Psychosocial factors In Eastern Europe) persons aged 45-64 were examined in 2003-2005 (n=1650, 34.9% males, mean age 54.25±0.2 years, response rate – 66.5%) [12].

In the framework of the screening studies a random representative sample survey of the population aged 25-44 years conducted in 2013-2016 by the budget scientific research theme, Gov. Task № 01201282292 (n=975, 43.8% males, mean age 34.5±0.4 years, response rate – 71.5%).

Within the framework of the budget theme No. AAAA-A17-117112850280-2 a survey of persons aged 35-64 was carried out in 2016-2017 (n=663, 41.3% males, mean age 51.95±0.32 years, response rate – 73.6%). The study included residents of the same district of Novosibirsk as in 1994-95, 2003-2005 and 2013-2016.

All samples were formed on the basis of electoral lists of citizens using a table of random numbers. A random mechanical selection procedure was used. The general survey was carried out according to the standard methods accepted in epidemiology and included in the MONICA program [11]. The methods were strictly standardized and complied with the requirements of the MONICA project protocol. Validation and processing of material according to the WHO MONICA-psychosocial program was carried out at the Information Collection Center of the MEDIS Institute in Munich, Germany (Institut für Medizinische Informatik und Systemforschung). Quality control was carried out in MONICA quality control centers: Dundee (Scotland), Prague (Czech Republic), Budapest (Hungary). The presented results were considered satisfactory.

The screening survey program included registration of socio-demographic data according to the standard epidemiological protocol of the WHO MONICA-psychosocial program: identification number, place of residence, full name, and date of birth, date of registration, gender, marital status, educational level, and professional status.

An attitude toward smoking and diet behavior were studied using the “Knowledge and Attitude to Own’s Health” scale proposed by the MOPSY protocol and adapted to the studied population [11]. The subjects were asked to answer the questions of the scale themselves according to the instructions placed on the scale. Individuals who did not complete the questionnaire were not included in the analysis.

Statistical analysis was performed using the SPSS software package version 11.5. The study participants were standardized by age groups in the analysis. To compare the indicators between

screenings, the corresponding age groups were used. To check the statistical significance of differences between groups, we used: the chi-square test ($\chi 2$). As a criterion of statistical significance the value of the chi-square was taken into account at a certain number of degrees of freedom. The reliability of analysis was accepted at a significance level of $p<0.05$.

Results

In 1988, only 20% of the male population in all age groups "never smoked". For comparison, more than 90% of women in older age groups had no experience of smoking. The number of women who quit smoking was higher in the youngest (16.4%) and men in the oldest age group (43.5%; p for all <0.001). Among smokers, the largest gender gap was observed among people "who tried to quit smoking unsuccessfully" (total indicator "I smoke less", "quit for a while", "quit unsuccessfully") - 15% on average. Most of the unsuccessful attempts to quit smoking were noted in the younger age groups of men and women (p for all <0.001).

In 1994, the proportion of responses "never smoked" decreased among the female population, with the exception of the oldest age group. In men, the proportion of smokers also increased in all age groups due to a decrease in the proportion of those who finally quit the bad habit (p for all <0.001). Among women, the proportion of those who quit smoking increased only in the younger age group 25-34 years old (16.4% and 10.2%, for 1988 and 1994). In comparison with 1988, there was an increase in unsuccessful attempts to combat smoking among women, with the exception of the older age group; among men, this did not have a distinct dynamic. Otherwise, the distribution of responses resembled the 1988 picture.

The share of women who never smoked in 2003-2005 clearly decreased among persons 45-54 and 55-64 years old - 64.3% and 66.2% (p for all <0.001). The proportion of men who never smoked did not change significantly, and the proportion of those who quit smoking returned to 1988 levels. The frequency of "successful" smoking cessation attempts increased among the female population in both age groups compared with previous periods (19.3% and 21.7%, respectively; p <0.001).

The response rate "never smoked" increased among men 25-34 and 35-44 years old (28.5% and 29%), while among women, on the contrary, it decreased in 2013-2016 (45.8% and 53.9% , p <0.001). At the same time, the proportion of those who quit smoking among men and women of this age increased to 25-29% (p for all <0.001). This affected the frequency of unsuccessful attempts to quit smoking: their proportion decreased, with the exception of women aged of 35-44 years.

In 2016-2017, among men, there was an increase in the answers "never smoked" in all age groups. On the contrary, among women of the younger age group 35-44 years old, by 2017, the trend towards a decrease in the proportion of never smokers remained - 53.1% (p <0.05). In the groups of women 45-54 and 55-64 years old, the proportion of never smokers increased in comparison with 2003-2005 (70.3% and 71.2%, respectively, p <0.001), although it was below the levels of 1988-1994. The frequency of unsuccessful attempts to quit smoking in the group of women 35-44 years old was at the same level as in 2013-2016 (17.4% and 18.9%, respectively), which is more than in 1988 and 1994.

Table 1: Gender differences in trends of attitude toward smoking in population of 25-64 years depending on age

Smoking status		25-34 years				35-44 years				45-54 years				55-64 years				25-64 years			
		M		F		M		F		M		F		M		F		M		F	
		N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Have you ever tried to change anything about your smoking?																					
1. Never smoked	1988	37	19.5	133	75.1	34	18.3	170	84.6	18	21.8	169	97.7	35	19.3	111	91.0	144	19.5	589	86.4
2. Smoked but quit		26	14.2	29	16.4	37	20.8	19	9.5	55	32.2	1	0.6	79	43.5	4	3.3	197	26.6	53	7.8
3. I smoke, but less		13	6.8	7	4.0	21	10.9	2	1.0	11	5.8	0	0	11	6.2	1	0.8	56	7.6	13	1.9
4. Was able to quit smoking for a while		51	26.6	3	1.7	34	17.8	5	2.5	23	12.6	1	0.6	28	15.2	2	1.6	136	18.6	11	1.6
5. Tried to quit unsuccessfully		32	16.6	4	2.3	35	18.8	3	1.5	25	14.4	1	0.6	21	11	3	2.5	113	15.5	11	1.6
6. I smoke, never tried to quit		32	16.6	1	0.6	26	13.4	2	1.0	25	13.2	1	0.6	10	4.8	1	0.8	93	12.4	5	0.7
Total		191	100	177	100	187	100	201	100	177	100	173	100	184	100	122	100	739	100	682	100
		$\chi 2$=149.425 df=5 p<0.001				$\chi 2$=180.961 df=5 p<0.001				$\chi 2$=180.961 df=5 p<0.001				$\chi 2$=152.773 df=5 p<0.001				$\chi 2$=647.870 df=5 p<0.001			

1. Never smoked	1994	36	20.4	67	52.8	26	14.9	120	77.9	29	20.9	36	81.8	43	25.7	57	90.5	134	20.4	280	72.2
2. Smoked but quit		11	6	13	10.2	33	18.4	14	9.1	30	21.6	2	4.5	44	26.3	3	4.8	118	18	32	8.2
3. I smoke, but less		23	13.2	16	12.6	24	13.8	5	3.2	17	12.7	2	4.5	22	12.9	0	0	86	13.2	23	5.9
4. Was able to quit smoking for a while		42	24	14	11.0	34	19	3	1.9	18	13.4	3	6.8	25	14.6	1	1.6	119	18	21	5.4
5. Tried to quit unsuccessfully		42	24	8	6.3	34	19	7	4.5	23	17.2	0	0	17	9.9	0	0	116	17.6	15	3.9
6. I smoke, never tried to quit		21	12	9	7.1	26	14.9	5	3.2	19	14.2	1	2.3	18	10.5	2	3.2	84	12.8	17	4.4
Total		175	100	127	100	177	100	154	100	136	100	44	100	169	100	63	100	657	100	388	100
		$\chi2$=46.211 df=5 p<0.001				$\chi2$=137.696 df=5 p<0.001				$\chi2$=54.128 df=5 p<0.001				$\chi2$=79.936 df=5 p<0.001				$\chi2$=277.250 df=5 p<0.001			
1. Never smoked	2003									5	18.1	356	64.3	67	24.6	344	66.2	122	21.2	700	65.2
2. Smoked but quit										100	32.9	107	19.3	117	43.0	113	21.7	217	37.7	220	20.5
3. I smoke, but less										27	8.9	28	5.1	19	7.0	24	4.6	46	8.0	52	4.8
4. Was able to quit smoking for a while										40	13.2	19	3.4	21	7.7	18	3.5	61	10.6	37	3.4
5. Tried to quit unsuccessfully										42	13.8	28	5.1	28	10.3	11	2.1	70	12.2	39	3.6
6. I smoke, never tried to quit										40	13.2	16	2.9	20	7.4	10	1.9	60	10.4	26	2.4
Total										304	100	554	100	272	100	520	100	576	100	1074	100
										$\chi2$=311.341 df=5 p<0.001				$\chi2$=133.774 df=5 p<0.001				$\chi2$=313.175 df=5 p<0.001			
1. Never smoked	2013	47	28.5	97	45.8	76	29.0	179	53.9									123	28.8	276	50.7
2. Smoked but quit		46	27.9	61	28.8	76	29.0	82	24.7									122	28.6	143	26.3
3. I smoke, but less		11	6.7	11	5.2	29	11.1	20	6.0									40	9.4	31	5.7
4. Was able to quit smoking for a while		27	16.4	31	14.6	35	13.4	26	7.8									62	14.5	57	10.5
5. Tried to quit unsuccessfully		25	15.2	5	2.4	25	9.5	17	5.1									50	11.7	22	4.0
6. I smoke, never tried to quit		9	5.5	7	3.3	21	8.0	8	2.4									30	7.0	15	2.8
Total		165	100	212	100	262	100	332	100									427	100	544	100
		$\chi2$=27.897 df=5 p<0.001				$\chi2$=44.533 df=5 p<0.001												$\chi2$=64.410 df=5 p<0.001			
1. Never smoked	2017					23	32.9	52	53.1	24	29.3	97	70.3	32	26.4	109	71.2	79	28.9	258	66.3
2. Smoked but quit						23	32.9	25	25.5	36	43.9	19	13.8	42	34.7	29	19.0	101	37.0	73	18.8
3. I smoke, but less						7	10.0	4	4.1	12	14.6	3	2.2	25	20.7	5	3.3	44	16.1	12	3.1
4. Was able to quit smoking for a while						9	12.9	4	4.1	4	4.9	4	2.9	13	10.7	6	3.9	26	9.5	14	3.6
5. Tried to quit unsuccessfully						7	10.0	9	9.2	2	2.4	7	5.1	6	5.0	2	1.3	15	5.5	18	4.6
6. I smoke, never tried to quit						1	1.4	4	4.1	4	4.9	8	5.8	3	2.5	2	1.3	8	2.9	14	3.6
Total						70	100	98	100	82	100	138	100	121	100	153	100	273	100	389	100
						$\chi2$=11.478 df=5 p<0.05				$\chi2$=47.639 df=5 p<0.001				$\chi2$=59.618 df=5 p<0.001				$\chi2$=106.316 df=5 p<0.001			

The study of behavior in relation to nutrition among the population of 25-64 years showed the following trends in 1988. Men more often than women reported that they did not need to follow a diet: 51.4% and 31.8% (p <0.001). The proportion of such opinions decreased with age in both sexes. Men on the diet were absent in the younger age group; so surprising is their prevalence over women in the 55-64 age group (6.3% and 3.7%; p <0.001). In the general population of 25-64 years, the number of those was minimal, among men and women, and did not exceed 2.6% (p <0.001). The proportion of those who "unsuccessfully" or "did not regularly follow the diet" was 1.5-2 times higher among women in all age groups. The proportions of respondents who “should diet, but do not” were approximately equal in sex, with the exception of the oldest age group, where women were 5.9% more women (p <0.001).

In 1994, the structure of nutritional responses in younger age groups of men was identical to the previous screening. Among older men, there was an increase in "I don't need to diet" responses; there were 2 times more of them than women. Among women, this was observed only in the youngest group of 25-34 years old; the structure of answers here did not differ statistically from that of men. Compared to 1988, the proportion of women who follow a diet increased with age, reaching 10.8% in the oldest age group ($p < 0.001$). The proportion of unsuccessful dieting attempts (cumulative responses "I need to diet, but I don't do it", "I tried unsuccessfully" and "I do not regularly") was higher among women in all age groups.

Screening 2003-2005 was marked by a noticeable decrease in the number of respondents who "do not need to follow a diet" among the male and female part of the population 45-64 years old in both age groups: 45-54 years old - 40.8% and 17.9%, 55-64 years - 37.1% and 16.9%, for men and women, respectively ($p < 0.001$). As you can see, the gender differences were significant. In men, the proportion of people who follow a diet did not increase significantly, and in women it clearly decreased by 2-2.5 times, in comparison with 1994. This increased the proportion of women with "unsuccessful" dieting attempts. Thus, the gender gap in the frequency of unsuccessful attempts to follow a diet has grown even more over time.

The downward trend in the answers "I don't need to follow a diet" continued in 2013-2016 in young age groups, in persons of both sexes 25-44 years old. In comparison with 1988 and 1994, the proportion of those who followed the diet increased, which, however, did not exceed 10% among men and women ($p < 0.001$). More than half of the male and 2/3 female population of both young groups (25-34 and 35-44 years) were unsuccessful in trying to adhere to the diet during this period (p for all < 0.001).

In 2016-2017, there was a decrease in the proportion of participants who "do not need to follow a diet": 28% and 33.9% among men 45-54 and 55-64 years. Among women, on the contrary, these proportions increased approaching the indicators of 1988-1994, especially in the 35-44 age group. However, the share of those women who "changed their diet for health and followed the diet" also increased to 11.2% in the 35-44 age group; and in the older age groups 45-54 and 55-64, the frequency of such responses equaled the 1994 levels. Among men, such an increase was found in the group of 45-54 years only, reaching the maximum mean for the entire observation period in 17.1% and overtaking that indicator in women. Although the statistical differences by sex in this age group were questionable ($p = 0.064$), this affected the mean values among men in this screening. In dynamics, the frequency of unsuccessful attempts to follow a diet increased in both sexes, with the exception of women 35-44 years old.

Table 2: Gender Differences in Trends of Diet Behavior in Population of 25-64 Years Depending on Age

Diet behavior		25-34 years				35-44 years				45-54 years				55-64 years				25-64 years			
		M		F		M		F		M		F		M		F		M		F	
		N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Have you tried making any dietary changes?																					
1. I don't need to follow a diet	1988	113	59	67	37	105	56	66	32.7	73	41.3	53	29.4	88	47.9	36	26.5	379	51.4	225	31.8
2. I have to, but I don't		42	22	46	25.4	44	23.5	45	22.3	45	25.6	48	26.7	32	17.6	32	23.5	163	22	172	24.3
3. I tried but without success		13	7	25	13.8	15	8	38	18.8	13	7	20	11.1	15	7.8	6	4.4	56	7.5	90	12.7
4. I don't diet regularly		23	12	39	21.5	19	10.5	50	24.8	42	23.8	54	30.0	37	20.4	57	41.9	121	16.5	203	28.7
5. I follow a diet		0	0	4	2.2	4	2	1	1.5	4	2.3	5	2.8	12	6.3	5	3.7	20	2.6	18	2.5
Total		191	100	181	100	187	100	200	100	177	100	180	100	184	100	136	100	739	100	708	100
		$\chi2=23.604$ df=4 $p<0.001$				$\chi2=34.217$ df=4 $p<0.001$				n.s.				$\chi2=26.121$ df=4 $p<0.001$				$\chi2=23.604$ df=4 $p<0.001$			
1. I don't need to follow a diet	1994	103	59.1	59	48.4	97	54.6	52	34.7	77	56.9	13	30.2	98	57.9	17	26.2	375	57.1	141	37.1
2. I have to, but I don't		39	22	28	23.0	43	24.5	43	28.7	27	20	11	25.6	33	19.5	18	27.7	142	21.6	100	26.3
3. I tried but without success		9	5	14	11.5	13	7.4	21	14.0	13	9.2	7	16.3	11	6.3	4	6.2	46	6.9	46	12.1
4. I don't diet regularly		19	10.7	18	14.8	17	9.8	31	20.7	17	12.3	9	20.9	24	14.5	19	29.2	77	11.8	77	20.3
5. I follow a diet		5	3.1	3	2.5	7	3.7	3	2.0	2	1.5	3	7.0	3	1.9	7	10.8	17	2.6	16	4.2
Total		175	100	122	100	177	100	150	100	136	100	43	100	169	100	65	100	657	100	380	100
		n.s.				$\chi2=19.057$ df=4 $p<0.001$				$\chi2=11.494$ df=4 $p<0.05$				$\chi2=25.783$ df=4 $p<0.001$				$\chi2=42.475$ df=4 $p<0.001$			

1. I don't need to follow a diet	2003									124	40.8	99	17.9	101	37.1	88	16.9	225	39.1	187	17.4
2. I have to, but I don't										53	17.4	131	23.6	37	13.6	115	22.1	90	15.6	246	22.9
3. I tried but without success										46	15.1	124	22.4	44	16.2	89	17.1	90	15.6	213	19.8
4. I don't diet regularly										70	23.0	182	32.9	81	29.8	207	39.8	151	26.2	389	36.2
5. I follow a diet										11	3.6	18	3.2	9	3.3	21	4.0	20	3.5	39	3.6
Total										304	100	554	100	272	100	520	100	576	100	1074	100
										$\chi2=23.604$ df=4 p<0.001				$\chi2=54.945$ df=4 p<0.001				$\chi2=95.250$ df=4 p<0.001			
1. I don't need to follow a diet	2013	69	42.1	34	16.0	93	36.0	66	19.9									162	38.4	100	18.4
2. I have to, but I don't		37	22.6	33	15.6	58	22.5	70	21.1									95	22.5	103	18.9
3. I tried but without success		7	4.3	34	16.0	22	8.5	48	14.5									29	6.9	82	15.1
4. I don't diet regularly		41	25.0	88	41.5	64	24.8	117	35.2									105	24.9	205	37.7
5. I follow a diet		10	6.1	23	10.8	21	8.1	31	9.3									31	7.3	54	9.9
Total		164	100	212	100	258	100	332	100									422	100	544	100
		$\chi2=46.752$ df=4 p<0.001				$\chi2=23.904$ df=4 p<0.001												$\chi2=64.402$ df=4 p<0.001			
1. I don't need to follow a diet	2017					27	38.0	31	31.6	23	28.0	32	23.2	40	33.9	28	18.5	90	33.2	91	23.5
2. I have to, but I don't						11	15.5	11	11.2	16	19.5	22	15.9	25	21.2	28	18.5	52	19.2	61	15.8
3. I tried but without success						7	9.9	16	16.3	9	11.0	13	9.4	24	20.3	18	11.9	40	14.8	47	12.1
4. I don't diet regularly						22	31.0	29	29.6	20	24.4	59	42.8	27	22.9	61	40.4	69	25.5	149	38.5
5. I follow a diet						4	5.6	11	11.2	14	17.1	12	8.7	2	1.7	16	10.6	20	7.4	39	10.1
Total						71	100	98	100	82	100	138	100	118	100	151	100	271	100	387	100
						n.s.				$\chi2=8.875$ df=4 p=0.064				$\chi2=23.475$ df=4 p<0.001				$\chi2=16.835$ df=4 p<0.01			

Discussion

The proportion of people with experience of smoking is extremely high in the male population, reaching 80% and was practically unchanged from 1988 to 2003-05. Despite the fact that there are significantly fewer smokers among the female population, the proportion of non-smokers has been rapidly declining, especially in the younger age groups of 25-34 and 35-44 years. The proportion of women smokers began to increase in 1994, first in the younger age groups, and by 2003-05 in the older age groups. This is the most important observation about this behavioral characteristic. The increase in the proportion of young women who smoke goes against the notion of healthy behavior and multiplies preventive measures for cardiovascular health by zero. In men, the proportion of smokers also increased in 1994, but 20 years later, a downward trend was noted first in the younger, and in 2016-2017 in the older age groups of men.

Men of younger age groups more often than women tried unsuccessfully to give up a bad habit. But in 2013-2016, the proportion of those who quit smoking increased to 25-29%. This affected the frequency of unsuccessful attempts to quit smoking: their proportion decreased.

According to open source data (EuroStat), male smoking prevalence in the European Union fell from 37% to 30% between 2006 and 2017. Among women, this decline is less pronounced - from 27% to 22%. But in a number of countries, such as France, Croatia, there was an increase in women smoking during this period up to 32%. Despite the fact that smoking / consumption of tobacco products is classified as a male phenomenon, gender differences in northern countries (Denmark, Iceland, the Netherlands, Norway, Sweden and Britain) are less than 5% (according to WHO) [13]. Peak values of tobacco consumption in the period 2000-2020 were observed among men 35-44 and 45-54 years old, and among women aged 55-64 years. However, according to a WHO report, the decline in smoking frequency over a 20-year period occurred in all age groups of men and women. This is consistent with smoking trends among men in our study population, but not women. This ambiguity in smoking trends in the population of a large industrial

center in Siberia indicates a relatively low effect of the WHO Framework Convention on Tobacco Control. Probably, one should take into account the successful example of the application of the "WHO convention" in a number of Asian countries, since smoking cessation significantly affects the reduction of the burden of CVD [14, 15].

In our study, men were 1.5-2 times more likely than women to report that they did not need to follow a diet. With age, the share of such opinions declined. Between 1988 and 2003, the proportion of men and women who did not diet was the highest. A slight increase in the number of people adhering to the diet was observed in 2013-16 and 2016-17, but their proportion on average did not exceed 10%. An increase in the frequency of unsuccessful dieting attempts, especially among women, was also noted during this period. Diet men were absent in the younger age group in 1988; but in the 45-54 age group, their number reached a maximum of 17.1% in 2016-17, overtaking women in this indicator. The proportion of unsuccessful dieting attempts (cumulative responses "I need to diet, but I don't do it", "I tried unsuccessfully" and "I do not regularly") was higher among women in all age groups. The gender gap in the frequency of failed attempts to follow a balanced diet has been growing since 2003. And in 2013-16, more than half of the male and two-thirds of the female population were unsuccessful in trying to adhere to the diet. In 2016-2017, there was a decrease in the proportion of men aged of 45-54 and 55-64 years that "do not need to follow a diet". On the contrary, these proportions of women increased, approaching the indicators of 1988-1994, especially in group of 35- 44 years.

The impact of eating behavior on health can hardly be overestimated. Nutritional risks are among the top 5 attributable causes of mortality in the global Burden Diseases ranking. Dietary risks are in second place after high systolic blood pressure in women in the hierarchy of factors in the global assessment of attributable deaths - this is 3.48 million deaths, or 13.5% of all deaths among the female population in 2019 in the world. Among the male population, diet ranks third after smoking and systolic blood pressure [16].

In our previous publications, we have pointed to an increase in health care intentions in 2013 and 2017 in the studied population [17, 18]. But the population's conviction in the usefulness of preventive measures is not accompanied by an improvement in smoking and eating behavior in women and in the frequency of regular physical activity among men. In part, this is due to the belief in the ability of medicine to prevent heart disease which was observed during this period [17].

It is important to note that the lifestyle of the population can change over time, and as our research shows, not always for the better. Potential changes can lead to underestimation of the protective effects of a healthy lifestyle. Adherence to a healthy lifestyle, including traditional and less studied lifestyle factors, is associated with a significantly lower risk of all-cause mortality [1]. These results highlight the importance of promoting healthy habits as a cornerstone of health care and overall health promotion. A number of researchers emphasize that people without a history of CVD who do not have common cardiovascular risk factors are at significantly higher risk of death from cardiovascular pathologies and from all causes if they do not adhere to a healthy lifestyle. Strategies to encourage adoption of healthy lifestyles should be implemented among people at all levels of risk [19]. Improving behavioral characteristics, as well as expanding social interactions, reduces the risk of death, even among the elderly and senile [20]. Thus, modifiable risk factors reduce the effect of aging on disease burden.

Behavioral patterns are critical to the cardiovascular system regardless of blood pressure, cholesterol, glucose, or obesity levels. This shift in focus from disease prevention to health promotion is an important step in recognizing the relevance of lifestyle as a primary goal for health. It is time for health educators, clinicians, health administrators and insurance providers to follow suit by developing and implementing a comprehensive, ambitious program that includes measures and goals for psychosocial and behavioral characteristics in every aspect of the health care system. Entering your doctor's office, you need to not only ask: "What is my level of blood pressure, cholesterol and glucose?", But also: "What are my psychosocial health characteristics?"

Likewise, local state and federal officials must fulfill their responsibilities to protect public health and the economic viability of a nation by implementing evidence-based policies to change our schools, workplaces, restaurants and communities to ensure a healthier lifestyle. The best options include taxation and subsidies to change the price of foods that are less healthy than more healthy. These are multi-component wellness programs for students and workers, focused on stress management and behavior. Coordinated national programs to limit trans-fat and sodium in foods; improved layout of neighborhoods to integrate residential, school, work, retail and public spaces, increase the availability of recreational facilities and facilities, encourage active commuting and improve traffic safety, aesthetics and pedestrian traffic; and comprehensive approaches to tobacco reduction, including sustainable media and education campaigns, graphic warnings, higher taxes, advertising restrictions, culture-based smoking cessation counseling and support, and restrictions on smoking in public places, at work and in places of residence.

Our research shows that the effect of implementing fiscal measures and framework programs on improving behavior in the general population may be lower than expected. This suggests looking for other approaches. Improving the psychosocial health of the population and social interactions is one such path. Spending time with friends can have a positive impact on your health. The beneficial effects on health are realized through behavioral, psychosocial and physiological pathways. In fact, people with adequate social relationships have a significantly more favorable lifestyle and cardiovascular health profile [21]. The low level

of social ties among the population in Siberia is due to the fact that the population consists mainly of middle-aged people who work full time and do not have enough time for social interaction [22]. There is evidence that social relations in modern societies are deteriorating; therefore, it is necessary to emphasize the importance of social interaction in prevention activities. Our data increases the diversity of lifestyle factors and better captures the impact of today's complex lifestyles on cardiovascular health.

By following complementary strategies within and outside the health care system, we can improve the psychological and social health of populations in response to evidence that the vast majority of cardiovascular events can be prevented or delayed until later in life.

Conclusions

1. The consistently high proportion of men with smoking experience (80%) in the 25-64-year-old population decreased by an average of 9% in the period 1988-2017.
2. Despite the fact that there are significantly fewer smokers among the female population, their proportion began to increase in 1994, first in the younger age groups, and by 2003-05 in the older age groups.
3. Men of younger age groups more often than women tried unsuccessfully to give up a harmful habit. But in 2013-2016, the proportion of those who quit smoking increased to 25-29%.
4. Between 1988 and 2003, the proportion of men and women who did not follow the diet plan was the highest. Men were 1.5-2 times more likely than women to report that they did not need to follow a diet.
5. The gender gap in the frequency of failed attempts to follow a diet has been growing since 2003. And in 2013-16, more than half of the male and 2/3 of the female population were unsuccessful in trying to adhere to the diet.

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