



Study on the Behavioral Health Risk Factors of Sewing Industry Workers in Bulgaria

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Abstract

Over the past two decades, chronic non-communicable diseases (NCDs) have emerged as a paramount priority for the World Health Organization (WHO) due to their increasingly pervasive, epidemic character across the globe. These prolonged medical conditions lead to severe levels of morbidity, premature mortality, and long-term invalidization, culminating in profound public health, social, and economic consequences for modern societies. Academic consensus establishes that the primary triggers for the onset of chronic non-communicable diseases are modifiable behavioral health risk factors deeply embedded in daily lifestyles, such as poor nutrition, physical inactivity, tobacco smoking, and harmful alcohol consumption. These underlying risk factors manifest as distinct characteristics at the biological, psychological, familial, community, or cultural levels that precede chronic illness and are directly correlated with a significantly higher likelihood of negative health outcomes. Because these behavioral variables are inherently manageable and preventable, it is crucial to design and implement targeted health policies within the workforce aimed at their systematic reduction and optimization, a strategy that directly correlates with the improved health status of the broader population. Organized groups of workers within specific enterprise environments present an ideal, highly structured demographic for studying and mitigating these lifestyle risks. Driven by this epidemiological framework, this study conducts an empirical investigation among 503 working individuals within a large-scale manufacturing enterprise of the sewing industry in Bulgaria, offering valuable field insights for occupational health managers and regional public health policymakers seeking to foster preventive workplace wellness initiatives.

Keywords: behavioral health risk factors, health status, nutrition, locomotor activity, concentrated alcohol drinks

Introduction

The aim of this study is to analyze the main behavioral risk factors among workers in an enterprise from the sewing industry in Bulgaria and to identify measures for their optimization.

Objectives of the study:

1. To select a representative sample of workers carrying out various activities in the clothing business.
2. To conduct a survey among workers including questions identifying their lifestyle.
3. To analyze the results and to identify appropriate measures aiming at optimization of the behavioral factors.

Materials and methods: A survey for the behavioral risk factors of life is conducted among 503 workers in an enterprise from the sewing industry in Bulgaria. Of these 71 men and 432 women, aged 20 to 65 years, divided in six age groups and evaluated according to their sex and level of education.

The questionnaire is adapted and structured in order to obtain information on the main behavioral risk factors (nutrition, physical exercising, smoking and alcohol use). The questionnaire includes two parts: passport part with information about sex, date of birth, age and education of respondents and part two: Risk factors for the health, including information on behavioral risk factors of health (nutrition, physical activity, smoking and alcohol use).

Data is processed statistically by SPSS/PSPP analysis.

Results and discussion:

General characteristics of the respondents

From the included in the survey 503 persons, 71 are men and 432 - women, aged 20-65, arranged into six age groups as indicated below (Table 1).

Table 1

	Men							Women						
	<25	25-34	35-44	45-54	55-64	>65	total	<25	25-34	35-44	45-54	55-64	>65	total
number	3	13	26	13	15	1	71	1	31	104	158	136	2	432
%	4,2	18,3	36,6	18,3	21,1	1,4	100,0	0,2	7,2	24,1	36,6	31,5	0,5	100,0

The respondents with secondary education have the largest share - 85.9% men and 87.0% women. With higher education are 7.0% of men and 5.0% of women. Every

17th man and 13th woman attended school until the 8th grade. With elementary educated workers are respectively 1.4% and 0.8% of men and women, without education - 0.2% of women (Table 2).

Table 2

Education degree	Men		Women		Total	
	number	%	number	%	number	%
none	0	0,0	1	0,2	1	0,2
elementary	1	1,4	3	0,7	4	0,8
primary	4	5,6	32	7,4	36	7,2
secondary	61	85,9	376	87,0	437	86,9
higher	5	7,0	20	4,6	25	5,0

Behavioral Health Risk Factors

Nutrition

Rational nutrition is one of the main factors for good health. The survey results show that 71.8% of men and 59.7% of women have regularly breakfast in the morning. Accordingly, 28.2% of men and 40.3% of women do not have breakfast. It is known that breakfast is very important for health; the observation of this statement by the surveyed is relatively satisfying (Table 3).

Table 3

Do you have breakfast?	Men		Women		Total	
	number	%	number	%	number	%
yes	51	71,8	258	59,7	309	61,4
no	20	28,2	174	40,3	194	38,6

66.2% of men and 59.0% of women eat three times a day, and twice a day - respectively 19.7% and 27.3% of them. Four times - 9.9% of men and 8.3% of women. The percentage of persons eating single time a day is about 2.4%. Those receiving food five times or more also have a small share - 2.8% (Table 4).

Table 4

How many times do you eat per day?	Men		Women		Total	
	number	%	number	%	number	%
1	1	1,4	11	2,5	12	2,4
2	14	19,7	118	27,3	132	26,2
3	47	66,2	255	59,0	302	60,0
4	7	9,9	36	8,3	43	8,5
more	2	2,8	12	2,8	14	2,8

The fat used in the preparation of food is the sunflower oil in 94.6% of cases. Olive oil, grease or similar fats are used rarely - in about 6.0% of cases (Table 5).

Table 5

What kind of fats do you use for cooking?	Men		Women		Total	
	number	%	number	%	number	%
sunflower oil	65	91,5	411	95,1	476	94,6
margarine	1	1,4	2	0,5	3	0,6
olive oil	4	5,6	10	2,3	14	2,8
grease	1	1,4	5	1,2	6	1,2
I don't use fats	0	0,0	4	0,9	4	0,8

Bread is another typical product of nutrition for the Bulgarian workers. 79.3% of the respondents consume white bread, more expressed in men - 87.3% against 78.0% in women. 92.0% of men and women do not consume rye bread. The consumption of brown bread is slightly higher (8.5%). Other types of bread are consumed by about 0.8% of men and women, and 3.4% of them do not eat bread (Table 6).

Table 6

What kind of bread do you consume?	Men		Women		Total	
	number	%	number	%	number	%
rye/whole grain bread	5	7,0	35	8,1	40	8,0
brown bread	1	1,4	42	9,7	43	8,5
white bread	62	87,3	337	78,0	399	79,3
other	0	0,0	4	0,9	4	0,8
I don't eat bread	3	4,2	14	3,2	17	3,4

The consumption of 2 cups of coffee has the highest proportion among men and women - 46.9%; 25.0% of the respondents indicated that they drink 1 cup of coffee; 16.9% - 3 cups, and 3.8% - more. 19.7% of men and 5.3% of women do not drink coffee (Table 7).

Table 7

How many cups of coffee do you drink per day?	Men		Women		Total	
	number	%	number	%	number	%
1	12	16,9	114	26,4	126	25,0
2	29	40,8	207	47,9	236	46,9
3	10	14,1	75	17,4	85	16,9
more	6	8,5	13	3,0	19	3,8
I don't drink coffee	14	19,7	23	5,3	37	7,4

The consumption of salt among the population is high, both before and after tasting the food. The data shows that 67.6% of men and 66.0% of women add extra salt to the food after tasting it. 9.9% of men and 11.1% of women add extra salt to the food before tasting it. Only 1.6% of the respondents consume unsalted food (Table 8).

Table 8

Do you add extra salt to your food?	Men		Women		Total	
	number	%	number	%	number	%
never	15	21,1	92	21,3	107	21,3
sometimes	48	67,6	285	66,0	333	66,2
always	7	9,9	48	11,1	55	10,9
I eat unsalted food	1	1,4	7	1,6	8	1,6

21.9% of the surveyed men and women consume carbonated drinks very often; rarely - 64.4%; and 13.7% of them do not consume carbonated drinks (Table 9).

Table 9

Do you consume carbonated drinks in your family?	Men		Women		Total	
	number	%	number	%	number	%
very often	18	25,4	92	21,3	110	21,9
rarely	47	66,2	277	64,1	324	64,4
we don't	6	8,5	63	14,6	69	13,7

4.2% of men and 5.3% of women follow a diet plan. 15.5 % of men and 28.2% of women indicated that they rarely follow diets. The data shows that about 68.4% of the surveyed men and women do not follow dietary regimes (Table 10).

Table 10

Do you follow any dietary regimen?	Men		Women		Total	
	number	%	number	%	number	%
very often	3	4,2	23	5,3	26	5,2
rarely	11	15,5	122	28,2	133	26,4
I don't	57	80,3	287	66,4	344	68,4

52.1% of the respondents consider that they are with a normal weight; 32.6 percent - overweighted, and 4.2% - underweight. 5.6% of men and 12.0 % of women are unable to make an estimate (Table 11).

Table 11

What is your weight in your opinion?	Men		Women		Total	
	number	%	number	%	number	%
Normal	43	60,6	219	50,7	262	52,1
Underweight	5	7,0	16	3,7	21	4,2
Overweighted	19	26,8	145	33,6	164	32,6
I do not know	4	5,6	52	12,0	56	11,1

The healthy nutrition' principles are unknown to 3.6% for men and women. 57.7% are interested in them, and 38% did not show an interest in them (Table 12).

Table 12

Are you interested in the principles of healthy nutrition?	Men		Women		Total	
	number	%	number	%	number	%
yes	38	53,5	252	58,3	290	57,7
no	30	42,3	165	38,2	195	38,8
I have not heard about them	3	4,2	15	3,5	18	3,6

Conclusions:

- the frequency of eating is triple for 66.2 % of men and 59.0% women;
- morning breakfast was not accepted by nearly every third man and woman;
- the consumption of white bread dominates;
- high proportion of persons adding salt to food after tasting is observed - 66.2 % of men and women, and every ninth - before tasting the food;
- a change in eating habits have undertaken 31.6 % of men and women, as 5.2% - very often, and 26.4% - rarely.

Motor activity

Physical exersising is an important factor for the health and self-esteem of the persons. The low physical activity is a serious risk factor for health in the sewing industry. Doing exercise during leisure time is an investment in health.

The results showed that the share of those who do so is low - only 10.7%; 25.0% of men and 1.4% of women are doing exercise very rarely in the morning or during free time and 64.2% - not at all (Table 13).

Table 13

In the morning or during your free time do you physical exercises?	Men		Women		Total	
	number	%	number	%	number	%
Yes	14	19,7	40	9,3	54	10,7
No	38	53,5	285	66,0	323	64,2
Very rarely	19	26,8	107	24,8	126	25,0

The visits in the gym also showed extremely unsatisfactory results. Only 2,6 % of the respondents visit the gyms, and 4.4% - do it very rarely (Table 14).

Table 14

Do you visit a gym/fitness center?	Men		Women		Total	
	number	%	number	%	number	%
Yes	4	5,6	9	2,1	13	2,6
No	59	83,1	409	94,7	468	93,0
Very rarely	8	11,3	14	3,2	22	4,4

The survey results showed that for 15.5% of the men and 13.7 % of women the weekly physical activity is light; in 69.0% of men and 75.2 % of women it is moderate, while in 15.5 % of men and 11.1 % of women - vigorous (Table 15).

Table 15

What is your weekly physical activity?	Men		Women		Total	
	number	%	number	%	number	%
Light	11	15,5	59	13,7	70	13,9
Moderate	49	69,0	325	75,2	374	74,4
Vigorous	11	15,5	48	11,1	59	11,7

Walking is the most accessible physical activity for health according to the respondents in the survey. The survey results show that 79.9 % of men and women love walking, as most do it every day for at least 15-20 minutes (Tables 16 and 17).

Table 16

Do you like to walk?	Men		Women		Total	
	number	%	number	%	number	%
Yes	60	84,5	342	79,2	402	79,9
Non	11	15,5	90	20,8	101	20,1

Table 17

If yes, how often do this in the week?	Men		Women		Total	
	number	%	number	%	number	%

Every day 15 – 20 min.	28	46,7	168	49,1	196	48,8
two or three times at least per 15 min.	6	10,0	37	10,8	43	10,7
morning and evening for at least 30 minutes.	14	23,3	98	28,7	112	27,9
more than 60 min. daily	12	20,0	39	11,4	51	12,7

In the sitting position during 1-2 hours the day are staying 21,7% of men and women, for 3-4 hours a day – 10,5%, and more than six hours a day – 67,8% (Table 18).

Table 18

How many hours per day do you spend in sitting position?	Men		Women		Total	
	number	%	number	%	number	%
at least 1-2 hours	41	57,7	68	15,7	109	21,7
at least 3-4 hours	14	19,7	39	9,0	53	10,5
more than 6 hours a day	16	22,5	325	75,2	341	67,8

Conclusions: The level of the motor activity of the respondents is low, which implies a serious risk for the health.

Knowledge, skills and health behavior

The awareness of the surveyed persons about the individual elements of the healthy life style varies.

With the harm of smoking on health are familiar 90, 3% of men and women. This information is characteristic for both genders. However, 1,6% are not familiar that tobacco is harmful (Table 19).

Table 19

Do you believe that smoking is harmful to health?	Men		Women		Total	
	number	%	number	%	number	%
Yes	67	94,4	387	89,6	454	90,3
No	1	1,4	6	1,4	7	1,4
May be	1	1,4	33	7,6	34	6,8
I do not know	2	2,8	6	1,4	8	1,6

86,1% of men and women believe that alcohol abuse leads to negative health effects. In that are not confident 8, 0% and 4, 8% do not know. Alcohol is a stimulant for 1,2 % the respondents (Table 20).

Table 20

Do you consider that the alcohol is harmful to health?	Men		Women		Total	
	number	%	number	%	number	%
yes, when abused	62	87,3	371	85,9	433	86,1
No, it is stimulating	1	1,4	5	1,2	6	1,2
May be	6	8,5	34	7,9	40	8,0
I do not know	2	2,8	22	5,1	24	4,8

The majority of the surveyed workers (90, 1%) believe that the physical activity is of great importance for their health (Table 21).

Table 21

Do you think that the physical activity is of great importance for the health?	Men		Women		Total	
	number	%	number	%	number	%
Yes	66	93,0	387	89,6	453	90,1
No	0	0,0	4	0,9	4	0,8
Maybe	4	5,6	29	6,7	33	6,6
I do not know	1	1,4	12	2,8	13	2,6

95,4% of the surveyed are convinced about the importance of the diet on health. 3,8% of the surveyed have no knowledge on the matter, and only 0,8% reported that it was not important (Table 22).

Table 22

Do you consider that the diet is important for the good health?	Men		Women		Total	
	number	%	number	%	number	%
Yes, it is important	66	93,0	414	95,8	480	95,4
No, it is not important	2	2,8	2	0,5	4	0,8
I do not know	3	4,2	16	3,7	19	3,8

Most of surveyed workers receive information about healthy lifestyle from their GP - 39.2 %. The media are the main source of information for 36.4 %. 18.7% rely on the experience of friends and 5.8% on the campaigns of the Regional Health Inspectorates (RHI) - Table 23.

Table 23

From where you receive information about the healthy lifestyle?	Men		Women		Total	
	number	%	number	%	number	%

From the campaigns of the Regional Health Inspectorates	6	8,5	23	5,3	29	5,8
From the media	28	39,4	155	35,9	183	36,4
Form my GP	22	31,0	175	40,5	197	39,2
From friends	15	21,1	79	18,3	94	18,7

Smoking

The results of the survey conducted showed that 49.3% of men and 56.3% of women live in families of smokers (Table 24). It can be said that every 11th man smoker and every 18th woman passes over five hours per day in a tobacco smoke environment. Besides them, 14.4% of men and 11.1% of women are in a smoke environment for 1 to 4 hours. For 78.6% of men and 84.6% of women the environment at home and in the workplace is almost tobacco smoke free (Table 25).

Table 24

Do you have any smokers in the family?	Men		Women		Total	
	number	%	number	%	number	%
yes	35	49,3	243	56,3	278	55,3
no	36	50,7	189	43,8	225	44,7

Table 25

If you are not a smoker, how many hours per day you spend in a place where someone else smokes?	Men		Women		Total	
	number	%	number	%	number	%
0	33	78,6	247	84,6	280	83,8
1	2	4,8	16	5,5	18	5,4
2	2	4,8	6	2,1	8	2,4
3	2	4,8	6	2,1	8	2,4
4	0	0,0	4	1,4	4	1,2
5 and more hours	3	7,1	13	4,5	16	4,8

The data shows that 40.8% of men and 32.4% of women are smokers. The remaining 59.2% of men and 67.6% of women are non-smokers (Table 26).

Table 26

Are you a smoker?	Men		Women		Total	
	number	%	number	%	number	%
yes	29	40,8	140	32,4	169	33,6
no	42	59,2	292	67,6	334	66,4

Every 5th surveyed man smoker and 7th woman has started smoking at the age under 18. The largest share is of those who began smoking between 18 and 25 years old for men and women (respectively 75.9% and 75.0%). An interesting fact is that 11.4% of women started smoking after the age of 25, while men share in this case is only 3.4% (Table 27).

Table 27

What age did you start smoking?	Men		Women		Total	
	number	%	number	%	number	%
under 18 years old	6	20,7	19	13,6	25	14,8
18-25 years old	22	75,9	105	75,0	127	75,1
above 25 years old	1	3,4	16	11,4	17	10,1

The intensity of smoking among men and women has significant differences. Women are mostly moderate smokers (1-10 cigarettes daily) - 80.7% of them, while for men the proportion is 51.7%. As regards to men, every second is an intense smoker (11-20 cigarettes per day), while for women it can be said for every fifth is a smoker. A positive fact is that in both sexes there are no heavy smokers (≥ 21 cigarettes per day) - Table 28.

Table 28

If you are not a smoker, how many hours do you spend at a place, where someone else smokes?	Men		Women		Total	
	number	%	number	%	number	%
1-10 (moderate)	15	51,7	113	80,7	128	75,7
11-20 (intense)	14	48,3	27	19,3	41	24,3
≥ 21 (heavy)	0	0,0	0	0,0	0	0,0

Many smokers attempt to quit smoking. This does not always end up with success. The results of the survey show that 69.0% of men and 60.0% wish to quit. Every fourth man smoker and every third woman does not wish to quit smoking (Table 29).

Table 29

Do you wish to quit smoking?	Men		Women		Total	
	number	%	number	%	number	%
yes	20	69,0	84	60,0	104	61,5
no	9	31,0	56	40,0	65	38,5

The data shows that more than half of the smokers of both sexes have tried to quit smoking - 59.2%. Almost every third man smoker has never made an attempt to quit smoking and as regards women - 41.4% of them (Table 30).

Table 30

Have you ever made an attempt to quit smoking?	Men		Women		Total	
	number	%	number	%	number	%
yes	18	62,1	82	58,6	100	59,2
no	11	37,9	58	41,4	69	40,8

Alcohol Consumption

Alcohol is one of the risk factors for health when abusing with. Survey data showed that 22.5% of men and 59.5% of women do not consume alcohol. Very rarely do so respectively 35.2% and 36.6% of them. Regular consumers of alcohol are 42.3% of the men and 3.9% of the women (Table 31).

Table 31

Are you taking alcohol?	Men		Women		Total	
	number	%	number	%	number	%
Yes	30	42,3	17	3,9	47	9,3
No	16	22,5	232	53,7	248	49,3
Very rarely	25	35,2	158	36,6	183	36,4
I never consume	0	0,0	25	5,8	25	5,0

The data showed that 41.8% of the men and 78.3% of the women consume alcohol once a week. 40.0% of the men and 17.1% of the women consume alcohol 2-3 times per week and 18.2% of the men and 4.6% of the women - every day (Table 32).

Table 32

If you use, how many times per week?	Men		Women		Total	
	number	%	number	%	number	%
Once	23	41,8	137	78,3	160	69,6
Two – three times	22	40,0	30	17,1	52	22,6

Every day	10	18,2	8	4,6	18	7,8
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There are differences in the consumption of different the types of alcoholic beverages, shown on Table 33 below:

Table 33

If you drink alcohol, what kind you prefer?	Men		Women		Total	
	number	%	number	%	number	%
Concentrate	25	45,5	55	31,4	80	34,8
Vine	9	16,4	82	46,9	91	39,6
Beer	21	38,2	38	21,7	59	25,7

Concentrates are preferred drink almost every second man and third women. Within men, those consuming the highest share of 1 cup at a time are 64.0%. The relative share of the consumers of 2 (two) cups of concentrate is 28.0%, while the next group (3 cups) are 8.0%.

The case within women is different. In this group the consumption is lower than that of males, most often 1 cup portion at 85.5% of them. Every seventh woman consumed 2 cups. There are no cases with consumption of 3 or more cups at once (Table 34).

Table 34

If you use it what quantity you drink at once (concentrate)	Men		Women		Total	
	number	%	number	%	number	%
1 cup	16	64,0	47	85,5	63	78,8
2 cups	7	28,0	8	14,5	15	18,8
3 cups	2	8,0	0	0,0	2	2,5

The vine is a drink for 16,4% of men and 46,9% of the women. For 77,8% of the men the most frequent consumption is of 150-200 ml. at the same time, and the remaining 22,2% consume more that 250-300 ml. 3.3% of the men consume more that 4 cups. Unlike the men, the women consuming 50-100 ml of wine are with the larger share – 48,8%, followed by the share of women, consuming 150-200 ml - 45,1%. The indicators for the consumption of larger quantities 250-300 ml and more are lower - every 13th woman - consumer (Table 35).

Table 35

If you use it what quantity you drink at once (vine)	Men		Women		Total	
	number	%	number	%	number	%
50-100 ml	0	0,0	40	48,8	40	44,0
150-200 ml	7	77,8	37	45,1	44	48,4
250-300 ml	1	11,1	4	4,9	5	5,5
more	1	11,1	1	1,2	2	2,2

Beer is consumed by 38.2% of men and 21.7 % of women. One bottle of beer at once drank 52.4% of men, two bottles at a time - 28.6%, three bottles at a time - 14.3%, and more - 4.8 % of them. Consumption within women reveals differences from men. All have indicated consumption of one bottle at a time (Table 36).

Table 36

If you use it what quantity you drink at once (beer)	Men		Women		Total	
	number	%	number	%	number	%
1	11	52,4	38	100,0	49	83,1
2	6	28,6	0	0,0	6	10,2
3	3	14,3	0	0,0	3	5,1
more	1	4,8	0	0,0	1	1,7

The data showed that 98,3% do not feel the need to drink something alcoholic since the morning. In 1.3% this happens very rarely, and in 0.4% always (Table 37).

Table 37

Did you need to drink anything alcoholic in the morning?	Men		Women		Total	
	number	%	number	%	number	%
Yes	0	0,0	1	0,6	1	0,4
No	52	94,5	174	99,4	226	98,3
Very rarely	3	5,5	0	0,0	3	1,3

The overdrink with or without occasion is usually in 2.6% of the persons, and very rarely - in 10.0 %. More common is for men compared to women (Table 38).

Table 38

Normally, do you overdrink with or without occasion?	Men		Women		Total	
	number	%	number	%	number	%
Yes	4	7,3	2	1,1	6	2,6
No	38	69,1	163	93,1	201	87,4
Very rarely	13	23,6	10	5,7	23	10,0

Regarding the health status of the respondents, the survey results are negative and indicate a strong predominance of negative behavioral factors of life, such as:

1. Nutrition of the working people in the examined enterprise of the sewing industry in Bulgaria is not sufficiently healthy.
2. The locomotor activity of respondents is low.
3. The share of smokers is high, especially when more than half of the smokers are men.
4. The preferred form of alcohol taking for every second man and every third woman is a concentrate.

The conclusions made impose immediate compulsory measures in order to widen the health awareness of the employees aiming at improving their lifestyle and neutralization of the behavioral risk factors triggering the chronic non-communicable diseases.

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