

# Smoking and work overload level

## *Fumatul și nivelul de suprasolicitare profesională*

### Abstract

Smoking is one of the major causes of morbidity and mortality worldwide, and Romania makes no exception. On the other hand, work overload has become the second cause of illness among employees in Europe, being a major factor which favors multiple addictions, including smoking. This study is part of a broader investigation that aims to analyze from several perspectives the link between socio-professional factors and smoking. **Keywords:** smoking, work overload, job, stressors

### Rezumat

Fumatul este una din cauzele majore de îmbolnăvire și mortalitate în întreaga lume și România nu face excepție. Pe de altă parte, stresul profesional a devenit a doua cauză de îmbolnăvire în rândul angajaților din Europa, fiind un factor important care favorizează o multitudine de adicții, inclusiv fumatul. Studiul prezentat în această lucrare face parte dintr-o anchetă mai amplă care și-a propus să analizeze din mai multe perspective legătura dintre factorul socio-profesional și fumat. **Cuvinte-cheie:** fumat, suprasolicitare profesională, loc de muncă, factori stresori

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## Introduction

Smoking is a major public health problem with a strong social and emotional determinism. After 1990, in Romania, the number of smokers, especially among young people, has increased dramatically, a phenomenon which may be linked to the increased saturation in the new market economy and to the excessive mediatization of tobacco products while legal regulations that limited tobacco consumption were practically nonexistent. The number of smokers has become one of the highest in Europe (27% of the population), a percentage which places Romania in the top countries with the highest number of smokers according to the data provided by the European Commission in 2015<sup>(1)</sup>.

According to World Health Organization, smoking caused the death of over 6 million people worldwide, a number estimated to increase to 8 million by 2030. In Europe, smoking kills 700,000 people every year<sup>(2)</sup>. These are the reasons why Romania has recently implemented legislative measures to combat this phenomenon by restricting smoking in public places.

Professional environment should be an important factor in promoting smoking reduction. As regulated by the Labour Protection Act, the management has clearly defined responsibilities to ensure a healthy working environment, including controlling indoor pollution due to the gases and the particles released into the air by tobacco smoke. As is well-known that there is a direct relationship between environmental toxicity and active or passive smoking; reducing this type of pollution requires companies to take proper organizational measures and to implement efficient anti-smoking programs for all employees.

It is also well defined, in legal terms, the management's obligation to deal with work overload in order to reduce it progressively. Work overload has become the second leading cause of illness among employees in

Europe, responsible for complex side effects and health risks including mental (from general fatigue and sleep disturbances to the burnout syndrome) and physical (risk factor for metabolic syndrome and its consequences, cardiovascular disease, diabetes, some types of cancer) disorders. Also, work stress is an important factor in the development of different types of addiction, including smoking.

## Objectives

A general survey was conducted among the general population, analysing the relationship between smoking and the socio-professional factor from several perspectives. In the following pages, we will present some results of the survey, precisely those regarding the relationship between work overload, generated by stress factors, and smoking, as well as the influence of the educational level and job position on this relationship.

## Materials and methods

The link between work overload and smoking was investigated in a cross-sectional observational study. In order to be completed by a large number of respondents, an auto-format questionnaire was used; the questionnaire was distributed online via GOOGLE FORMS and social networks. These methods were preferred because the investigation aimed to identify the overall relationship that characterizes the phenomenon, and not a particular situation in a particular workplace.

There were closed-ended questions, dichotomous questions (Yes/No), numeric questions (age), selection of predefined options or free fields (e.g., the answer about the existing pathology). There were recorded demographics (gender, age, place of residence) and professional data: education, current occupation, type of activity, level of physical or mental overload generated by current activities.

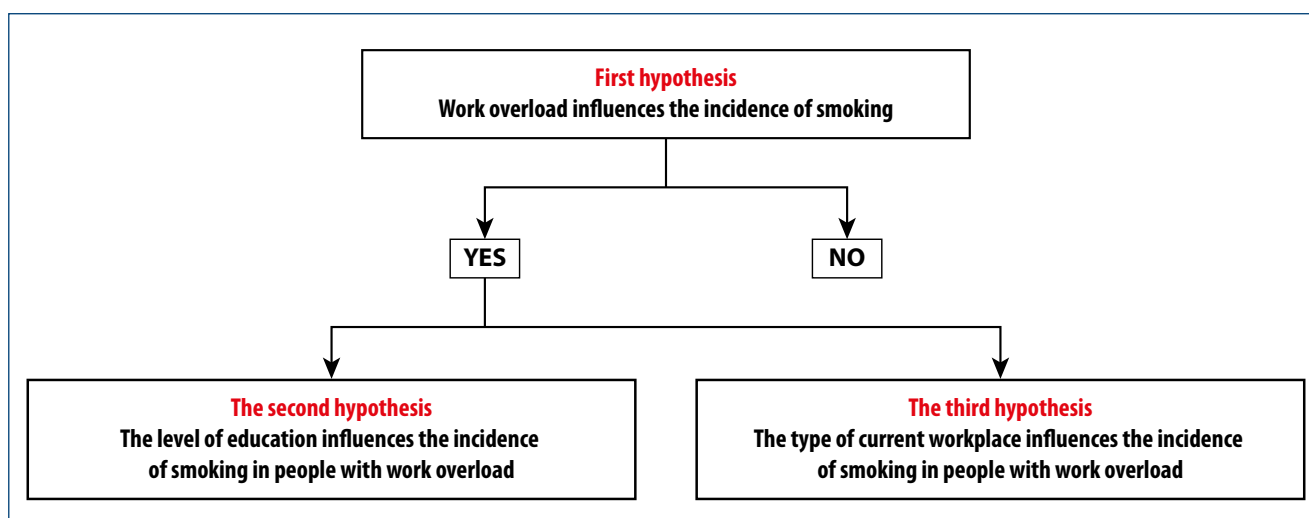


Figure 1. Work hypothesis

Table 1 Characteristics of respondents

	Women	Men	Total
<b>Number</b>	3098	1864	4962
<b>Average age</b>	26.7 ± 7.4*	29.2 ± 8.3*	7.6 ± 7.8
<b>Place of residence</b>			
<b>Urban</b>	2849	1753	4602
<b>Rural</b>	249	111	360
<b>Current occupation</b>			
<b>Employees in private sector</b>	1163	949	2112
<b>Employees in state sector</b>	457	249	706
<b>Unoccupied</b>	41	26	67
<b>Self-employed</b>	265	239	504
<b>Retired</b>	17	5	22
<b>Housemakers</b>	31	2	33
<b>Unemployed</b>	14	15	29
<b>University students</b>	800	232	1032
<b>High school pupils</b>	303	145	448
<b>Middle school pupils</b>	7	0	7

The educational level factor was classified into 4 categories: secondary education, high school, post-secondary schools and university.

Regarding the current job, the respondents selected from eight possible choices: pupil, student, employee in the state sector, employee in the private sector, self-employed, unemployed, homemakers or unoccupied.

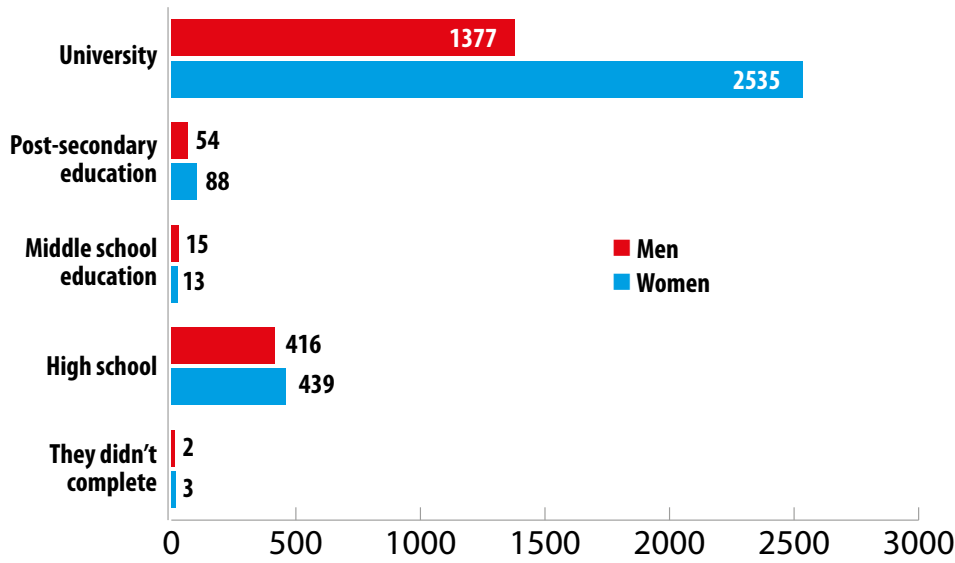
Questions about smoking aimed to identify smokers, as well as the relationship between smoking and job characteristics.

Data were processed using Excel Stat Plus 2013. For numeric variables, the frequency, mean and standard deviations were calculated, and Student test was used to assess differences between groups. Distribution analysis on non-parametric variables used Chi square test.

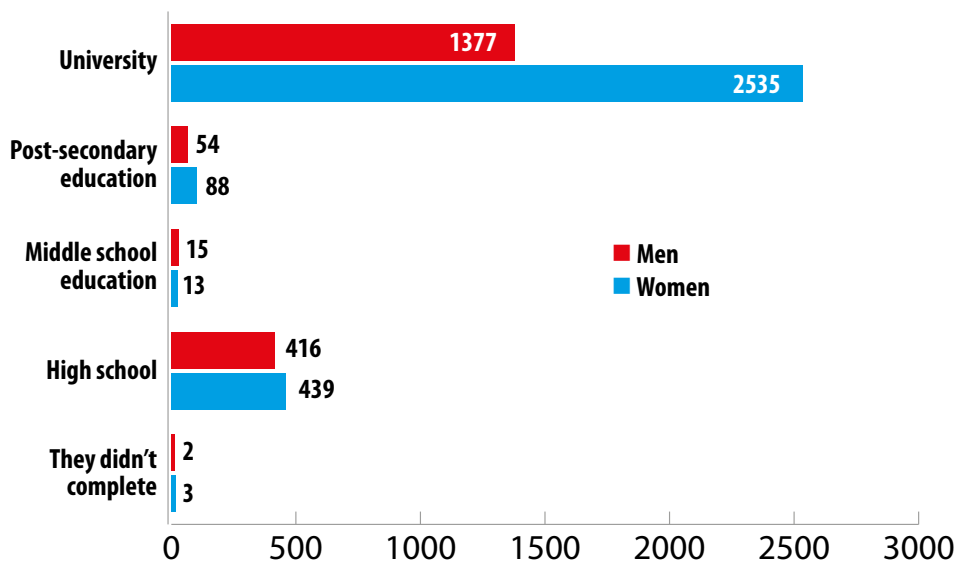
Firstly, the hypothesis that work overload increases the risk of being a smoker was tested; afterwards it was tested whether the level of education and current workplace influence this relationship (Figure 1).

## Results

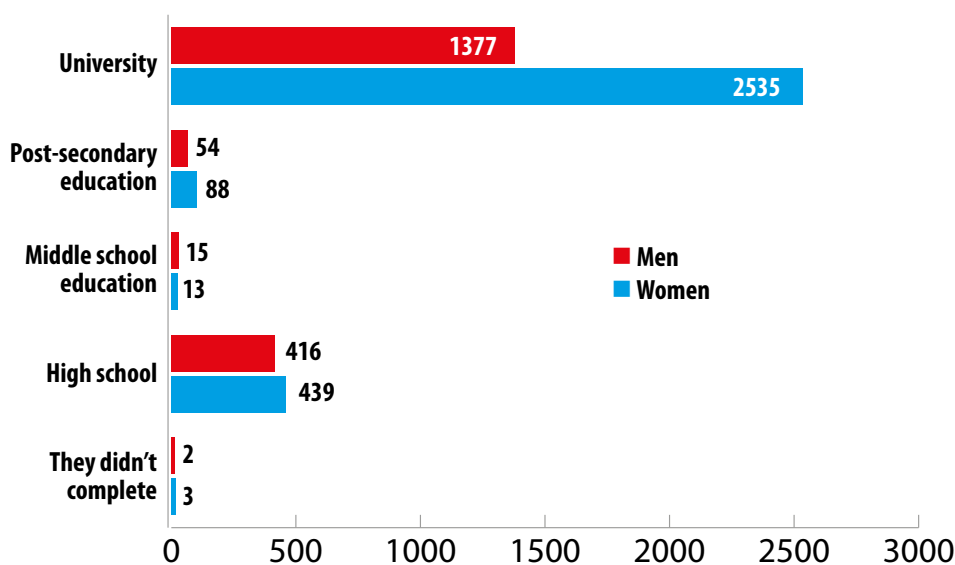
A total of 4962 people responded to questions, mostly women (62.43%). The main demographic characteristics are presented in Table 1. The average age of respondents was of 27.6 years. Women had a lower average age than men (Student test,  $p < 0.001$ ). The people who responded to our questionnaire were mostly between 16 and 25 years old (46%) and 26-35 years old (41%). The proportion of respondents from the 35-45 years old group and older was 8%, and 4%, respectively.



**Figure 2.** The distribution according to the level of education



**Figure 3.** The distribution of respondents according to the current workplace (current occupation)



**Figure 4.** Analysis of the type of overload

**Table 2** Distribution of smokers by type of work overload

	Women				Men				Total			
	Smokers		Non-smokers		Smokers		Non-smokers		Smokers		Non-smokers	
	Abs. val.	%	Abs. val.	%	Abs. val.	%	Abs. val.	%	Abs. val.	%	Abs. val.	%
Physical and mental overload	554	36%	451	29%	302	29%	242	29%	856	33%	693	29%
Without physical or mental overload	56	4%	97	6%	69	7%	86	10%	125	5%	183	8%
Physical overload	44	3%	44	3%	46	4%	30	4%	90	4%	74	3%
Mental overload	883	57%	969	62%	617	60%	472	57%	1500	58%	1441	60%
<b>Total</b>	<b>1537</b>		<b>1561</b>		<b>1034</b>		<b>830</b>		<b>2571</b>		<b>2391</b>	

78.84% of subjects who completed the questionnaire had higher education. A large number is represented by those who had completed high school and post-secondary schools. The small number of people (28 total, divided approximately equally between men and women) who had only middle school education was an expected result in this type of investigation. There were no differences in distribution among the group of women and the group of men (Chi test,  $p < 0.0001$ ) regarding the educational level (see Figure 2).

A total of 2112 respondents worked in private sector, most of them being men (51%). There was also recorded a large number of university students, especially women (26% versus 12% men). The absolute number of self-employed was relatively equal for the two genders (Figure 3). Statistical analysis of workplace distribution by gender in the study population showed a significant difference between men and women ( $p < 0.0001$ ).

The number of smokers in the group was 2571, representing 51.81% of the total group studied, 1537 women and 1034 men. The frequency of smokers was higher in men than women (55.47% and 49.61%, respectively).

The study analysed different characteristics of this population in relation to smoking and it was found that the distribution of smokers by place of residence (rural/urban) showed no statistically significant differences ( $p = 0.19$ ). There were no statistically significant differences in age in the group of women between smokers and non-smokers, but age was significantly higher in non-smoker men than in smoker men (T test,  $p = 0.1427$  and  $p = 0.002$ ).

When asked about the type of overload in their workplace, most respondents (4654, 93.79% of total) said that they face at least one type of stress. The most common type was mental overload – a total of 2941 positive answers were obtained (59.78% women and 58.42% men). 1549 people considered that their occupation requires both mental and physical overload; of those, 1005 were women and 544 were men (32.44% versus 29.18%). Only 3.31% of all respondents mentioned just physical overload and the absence of any form of stress has been recognized by 308 persons (6.2%). The distribution of responses to this question is illustrated in Figure 4. Overload level is perceived differently by men and women ( $p < 0.001$ ).

The distribution of smokers by level of work overload and by gender is presented in Table 2. There were found high rates of smokers especially among people who perceived mental overload (57% women and 60% men), followed by those who perceived a combined overload (physical and mental). The number of smokers was lower among those with physical overload or in those without any overload. Overall, there is a statistically significant difference in the distribution of smokers according to the type of overload declared by respondents (Chi-squared test  $p < 0.001$ ), but this difference is maintained only in the group of women (Chi-squared test  $p < 0.001$ ) and becomes statistically insignificant in the group of men ( $p = 0.177$ ). Therefore, the analysis of the influence of educational level and type of occupation presented herein will take into consideration only data from women's group.

Thus, it was analyzed the incidence of smoking in female employees according to their perception of work overload and education. Education is an influencing factor for smoker/non-smoker distribution in female employees who consider they are physically and mentally overloaded ( $p = 0.04104$ ). Among women with mental and physical overloading, smoking frequency was higher in the groups with lower education (61% high school, 66.7%, post-secondary school, compared to 53% in those with higher education). Differences in education level were insignificant for those with no type of overload ( $p = 0.6738$ ), for people who perceived only physical overload ( $p = 0.1269$ ) or only mental overload ( $p = 0.6607$ ). In all categories of professional activity, the proportion of women smokers was lower in women with higher education (48.8%), compared to 55% in those who have graduated high school and 58.9% in those with post-secondary schools.

Depending on the current workplace, it was noticed that the highest frequency of smoking women occurs in the unoccupied/unemployed ones (63.6%), followed, in descending order, by those working in private sectors (55.5%), high school students (53.5%) and self-employed (51.3%) – Table 3. The lowest frequency (23%) was registered among retired women and intermediate frequencies among employees in the state sector (47.3%), householders (45.2%) and students (38.2%). The differences between the categories aforementioned regarding

**Table 3** The distribution of smoking women according to the current workplace

	Women		
	Smokers		Non-smokers
	Absolute values	Percentage of smokers of all women	Absolute values
Employees in private sector	639	55%	523
Employees in state sector	214	47%	243
Without occupation	25	61%	16
Self-employed	136	51%	129
Retired	4	24%	13
Housemakers	13	43%	17
Unemployed	10	71%	4
Students/pupils	496	45%	616

frequency are statistically significant ( $p < 0.0001$ ). The relationship between smoking, the type of work overload and the working place was analyzed for employees in the state sector, employees in the private sector, pupils, students and self-employed – Table 4. For the other categories, the number of respondents was too small to be included in the analysis. As in the case of educational level, it was also identified a statistically significant relationship regarding the distribution of smokers by work in subjects with physical and mental overload ( $p < 0.0001$ ). In subjects who believed they had activities with other types of overload or without physical or mental overload, it was not identified a significant difference in the number of smokers according to their workplace ( $p = 0.7897$  for those without any overload,  $p = 0.5071$  for those with physical overload and  $p = 0.0260$  for those with mental overload).

## Discussions and conclusions

The results show that there are significant differences between work overloads, educational level, workplace and smoking incidence. Perceived work overload differs by gender; women tend to recognize more easily overloads, especially mental overloads. The percentage of smokers (55.47% men, 49.61% women) that was found is higher than the national average in the general population (27%)<sup>(1)</sup>, but is similar to that reported in other studies for employees who perform manual labor (blue collars; 52%), and it is much higher than the percentage of smokers who perform office work (white collars; 35%)<sup>(3)</sup>. The number of smokers may vary depending on the professional category from simple to double, being higher<sup>(4)</sup> among those with a low level of education<sup>(3,4,5)</sup>. These results are similar to those in our study. Females describing a high level of physical and mental overload in their professional activity are more likely to be smokers. This possibility is directly influenced by the level of education. On the other hand,

the results published by Somayeh Hassani, following a large study conducted in “automotive industry” in which participants had a similar level of training, showed a very low number of smokers among women, only 1.6% compared with 20.5% in men<sup>(6)</sup>. The differences we found might be explained by sociocultural differences that exist between the two studied populations.

The small number of unemployed people or without any occupation, and of housemakers or retired people doesn't allow us to draw conclusions on the prevalence of smoking in this category or to compare it with other studies. Also, the relatively large number of smokers among pupils and students cannot be linked only to overload, but to other psychosocial characteristics that weren't the object of our study.

Work overload, mental or physical, has objective indicators of measurement, but from the perspective of the addictive behavior, the perceived work overload is more important than the objective measurement of work overload. Moreover, our entire analysis is based on this perception, which is influenced by the type of personality, professional motivation, professional set of rewards and other individual factors. From the perspective of our goal, we believe that such an investigation, which takes into account the perception of overload and not the objective measurement of overload, is correct because addictive behavior is dominated by psycho-emotional characteristics and by the reality that the subject perceives<sup>(7,8)</sup>.

The association between stress and smoking was analyzed differently in other studies: using Kasareth model, the low level of decision and control over the activity was the stressor factor correlated with smoking behaviour<sup>(6)</sup>. Other authors have identified a somewhat paradoxical behavior: occupational stress has a significant direct influence on smokers with a small number of pack-years<sup>(5)</sup> compared to an insignificant influence on heavy smokers. The effect of occupational stress is

**Table 4** The distribution of smoking women according to the type of work overload

	With mental and physical overload		Physical overload		Mental overload		Without mental and physical overload	
	Smokers	Non-smokers	Smokers	Non-smokers	Smokers	Non-smokers	Smokers	Non-smokers
University	409	363	23	32	759	849	47	56
High school	111	71	16	8	106	108	21	18
Post-secondary education	30	15	3	3	14	12	5	6
<b>Total</b>	<b>550</b>	<b>449</b>	<b>42</b>	<b>43</b>	<b>879</b>	<b>969</b>	<b>73</b>	<b>80</b>

alleviated by an adequate social support. Using the effort - reward model to analyze occupational stress, a Finnish national survey revealed that people who perceive an imbalance between professional effort and rewards are more often smokers<sup>(9)</sup>.

The results are important because they identify in such a large group of population the increased incidence of the perceived work overload (93.79%), for the first time after the economic crisis of 2010. The link between smoking, workplace and the overloads identified in this study are additional arguments to support the need for preventive interventions to reduce work overload.

We underline the fact that our conclusions are relevant mainly for the population younger than 35 years old, who represent most of our respondents; this is a

consequence of the distribution of the questionnaire, specifically addressed to young people.

It is clear that smoking behaviour must be reduced, both for subjects who declare that smoking is the consequence of overload and for those who smoke for pleasure. Therefore, the fight against smoking and neuropsychological overload at work is the duty of every occupational physician who regularly monitors workforce. The employer has the responsibility to reduce overload, and to ensure a working environment free from pollutants. The study results are eloquent and must encourage stakeholders in the healthcare system to conduct informative and educational programs for employees in order to decrease the incidence of this harmful addictive behaviour. ■

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