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*Source / Izvornik:* **Collegium antropologicum, 2009, 33 Supplement 1, 61 - 66**

**Journal article, Published version**

**Rad u časopisu, Objavljena verzija rada (izdavačev PDF)**

*Permanent link / Trajna poveznica:* <https://um.nsk.hr/um:nbn:hr:142:514575>

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*Download date / Datum preuzimanja:* **2021-05-10**



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# Characteristics of Heavy Smokers in Croatia

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## ABSTRACT

*The aim of this paper was to investigate the socio-demographic characteristics of heavy smokers in comparison to group the characteristics of light smokers and non-smokers. Data used for this study was collected within the Croatian Adult Health Survey (CAHS). The results show a significant gender differences in the prevalence of heavy smoking, with higher prevalence among men in all age groups. Highest prevalence of heavy smoking was found in people 35 to 64 years of age, irrespective to gender. According to analyzed socio-demographic characteristics men with low education and income who changed place of living have higher prevalence of heavy smoking. Pattern was different in women smokers. Majority of women smokers were light smokers. In women with better than average household economic status there were more smokers than non-smokers, with notable high proportion of heavy smokers in age 18 to 34 years and light smokers in age group 35 to 64. While planning future interventions at the population level, we must consider all of these characteristics and links between them, and engage all segments of society.*

**Key words:** heavy smokers, risk factor, Croatian Adult Health Survey, Croatia

## Introduction

Smoking is the leading cause of premature death in Europe which we can efficiently prevent<sup>1</sup>. In high-income countries, smoking, alcohol use, overweight and obesity are the most important causes of cancer<sup>2</sup>. In Croatia there are more than one million smokers in the country of only about four million residents<sup>3</sup>. Diseases associated with smoking kill 10 000 people annually, while smoking induced diseases causes every fifth death<sup>3</sup>. The frequency of men smokers has declined while the frequency of female smokers has grown in the period between 1970 and 1997<sup>4,5</sup>. As progress has been made in tobacco control, some recent studies have also reported about the decrease of cigarettes smoked per day over time<sup>6-8</sup>. In Great Britain a trend of decrease in the prevalence of heavy smokers in the last two decades has been noticed<sup>9</sup>. Regarding the differentiation between smokers in heaviness of smoking, in literature heavy smokers are usually defined as smokers who smoke more than 20 cigarettes per day<sup>6</sup>. In Croatia heavy smokers are not well described as a segment of the smoking population. In this paper we will show the socio-demographic charac-

teristics of heavy smokers and compare them to the characteristics of light smokers.

## Materials and Methods

In this study the data from Croatia Adult Health Survey (CAHS) were used<sup>10</sup>, which covered a wide range of health-related indices and variables<sup>11,12</sup>. A multistage stratified sample design was used to draw a representative sample of general adult population. The survey targeted persons aged  $\geq 18$  years living in private households in the Republic of Croatia. The 2001 Croatian Census was used to select a representative sample of households to be included in this survey<sup>13</sup>. In total, 10,766 households were selected to participate in the 2003 CAHS. Response was obtained from 9,070 individuals, which gave the overall response rate of 84.3%. Trained public health nurses in face-to-face interviews administered the questionnaire<sup>11</sup>. Survey results were representative of the regional, sex, and age structure of the Croatian adult

population i.e., three age groups of 18–39, 40–64, ≥65 years of both men and women were represented.

*Statistical analysis*

For the sample descriptive purposes the variable on smoking was divided into three categories: heavy smokers (smoke 20 or more cigarettes every day), light smokers (smoke less than 20 cigarettes daily) and non smokers (don't smoke at all). Predictor variables included in the analysis were: age group (18–34, 35–64, and ≥65 years), gender (females and males), education level (low level – unfinished primary school or primary school; middle level – high school; and high level – college or university), self assessed monthly household income (less than 400 USD, between 400 and 1,200 USD and more than 1,200 USD), marital status (married or living in partnership, single, separated or divorced, widowed), employment status (employed or unemployed), change of living place between 1991 and 1995 (yes or no), self perceived

economic status in comparison with Croatian average (worse than average, average or better than average). The relationship between variables, we represented in contingency tables. All confidence intervals (CI) were calculated with 95% probability levels. Software SAS for Windows (version 8.2, SAS Institute Inc, Cary, NC) was used for the analysis<sup>14</sup>.

**Results**

The CAHS data suggested that in Croatia a total of 17.7% of population, or approximately 600,000 people were heavy smokers. In men of all age groups there was significantly larger number of heavy smokers than light smokers (Table 1). Amongst men aged 18–34 there was a significant difference in the heavy smoking prevalence in the following variables: married or living in partnership, who are employed and the average estimate of household economic status (Table 2). In the group of men aged

**TABLE 1**  
DISTRIBUTION OF HEAVY SMOKING AMONG POPULATION BY AGE GROUP AND GENDER

age	Men			Women			Total		
	N		%	N		%	N		%
	heavy smokers	all		heavy smokers	all		heavy smokers	all	
18–34	132,613	474,299	27.96	55,904	481,993	11.60	188,517	956,292	19.71
35–64	261,681	895,454	29.22	118,064	928,639	12.71	379,945	1,824,093	20.83
65+	36,144	270,670	13.35	12,359	428,529	2.88	48,503	699,199	6.94
total	430,438	1,640,423	26.24	186,327	1,839,161	10.13	616,965	3,479,584	17.73

**TABLE 2**  
DISTRIBUTION OF SMOKING PATTERNS AMONG MEN 18–34 YEARS BY SOCIO-DEMOGRAPHIC CHARACTERISTICS

Men 18–34 years	Heavy Smokers	Light Smokers	Non-Smokers	
	% (95% CI)	% (95% CI)	% (95% CI)	
Education	low	53.6 (36.2–70.1)	30.2 (16.9–48.0)	16.2 (7.4–31.9)
	middle	39.8 (31.1–49.1)	29.4 (22.1–38.0)	30.9 (23.2–39.7)
	high	28.4 (14.1–49.0)	27.3 (13.2–47.9)	44.4 (26.1–64.3)
Monthly household income	< 385 USD	59.9 (39.6–77.3)	27.9 (13.7–48.6)	12.2 (4.3–30.2)
	385–1.154 USD	38.6 (30.9–46.9)	29.5 (22.8–37.1)	32.0 (25.0–39.8)
	>1.154 USD	0	0	0
Married or living in partnership	yes	42.6 (30.7–55.4)	21.8 (13.9–32.7)	35.6 (24.5–48.4)
	no	39.9 (30.9–49.6)	33.1 (25.0–42.3)	27.0 (19.6–35.9)
Employment	yes	40.1 (31.2–49.8)	24.8 (17.7–33.5)	35.1 (26.5–44.9)
	no	41.8 (30.1–54.6)	35.8 (25.3–47.9)	22.4 (14.4–33.1)
Change of living place between 1991 and 1995	yes	53.7 (36.4–70.1)	27.2 (14.8–44.6)	19.1 (10.0–33.5)
	no	37.4 (29.7–45.7)	29.9 (23.0–37.8)	32.8 (25.4–41.1)
Estimate of household economic status	worse than average	37.9 (28.8–47.8)	32.2 (24.1–41.4)	30.0 (22.1–39.3)
	average	46.8 (35.0–59.1)	24.3 (15.7–35.6)	28.9 (19.1–41.1)
	better than average	0	0	100

**TABLE 3**  
DISTRIBUTION OF SMOKING PATTERNS AMONG MEN 35–64 YEARS BY SOCIO-DEMOGRAPHIC CHARACTERISTICS

Men 35–64 years	Heavy Smokers	Light Smokers	Non-Smokers	
	% (95% CI)	% (95% CI)	% (95% CI)	
Education	low	45.9 (38.8–53.2)	10.3 (6.8–15.2)	43.8 (36.7–51.2)
	middle	43.8 (39.1–48.5)	13.6 (10.7–17.2)	42.6 (38.0–47.4)
	high	35.2 (27.2–44.2)	10.9 (6.2–18.4)	53.9 (44.9–62.7)
Monthly household income	< 385 USD	49.0 (41.8–56.3)	13.6 (9.6–19.0)	37.4 (30.7–44.6)
	385–1.154 USD	41.3 (37.2–45.5)	12.1 (9.6–15.1)	46.6 (42.4–50.8)
	>1.154 USD	0	0	0
Married or living in partnership	yes	42.8 (38.9–46.9)	11.5 (9.2–14.3)	45.6 (41.7–49.7)
	no	43.6 (36.0–51.6)	17.9 (12.6–24.9)	38.5 (31.1–46.4)
Employment	yes	41.9 (36.8–47.2)	12.2 (9.1–16.1)	45.9 (40.8–51.1)
	no	44.0 (39.1–49.0)	12.7 (9.8–16.3)	43.3 (38.3–48.3)
Change of living place between 1991 and 1995	yes	41.5 (32.1–51.6)	15.6 (9.9–23.9)	42.8 (33.3–52.9)
	no	43.2 (39.4–47.1)	11.9 (9.6–14.6)	44.9 (41.1–48.8)
Estimate of household economic status	worse than average	42.7 (38.2–47.3)	12.8 (9.9–16.3)	44.5 (40.0–49.1)
	average	43.0 (37.2–49.1)	12.1 (9.0–16.1)	44.9 (39.0–50.9)
	better than average	57.6 (19.3–88.6)	3.1 (0.4–22.1)	39.2 (10.0–78.9)

35–64 there was a significant difference in the heavy smoking prevalence in all of the analyzed variables, except in the better than average estimate of household economic status (Table 3). More than 1/3 of men 35–64 years old declares as non-smoker irrespective to socio-demographic characteristics (Table 3). This comes to more than 2/3 in men 65 years and older (Table 4). Amongst men aged 65 or older there was a significant difference in

the following variables: low education, monthly household income 385–1154\$, monthly household income >1154\$, married or living in partnership, who are unemployed, who haven't changed their living place between 1991 and 1995, average estimate of household economic status and better than average estimate of household economic status (Table 4). Young women aged 18–34 had higher prevalence of light smoking than heavy smoking

**TABLE 4**  
DISTRIBUTION OF SMOKING PATTERNS AMONG MEN 65 YEARS AND OLDER BY SOCIO-DEMOGRAPHIC CHARACTERISTICS

Men ≥65 years	Heavy Smokers	Light Smokers	Non-Smokers	
	% (95% CI)	% (95% CI)	% (95% CI)	
Education	low	23.6 (18.2–30.1)	10.8 (7.3–15.8)	65.5 (58.6–71.8)
	middle	18.8 (13.8–25.2)	12.9 (8.8–18.6)	68.2 (61.1–74.6)
	high	13.2 (6.9–23.6)	10.1 (4.7–20.3)	76.7 (65.1–85.4)
Monthly household income	< 385 USD	21.1 (14.4–29.9)	13.3 (8.1–21.0)	65.6 (56.1–74.1)
	385–1.154 USD	20.2 (16.2–24.9)	11.1 (8.3–14.9)	68.7 (63.5–73.4)
	>1.154 USD	20.4 (16.8–24.4)	11.6 (8.9–14.8)	68.1 (63.6–72.3)
Married or living in partnership	yes	20.1 (16.8–24.7)	10.4 (7.7–13.9)	69.5 (64.5–74.1)
	no	21.4 (13.9–31.4)	16.6 (10.1–26.0)	62.1 (51.6–71.5)
Employment	yes	15.9 (5.5–37.9)	6.8 (1.2–29.7)	77.3 (55.2–90.4)
	no	20.6 (17.0–24.8)	11.9 (9.1–15.2)	67.5 (62.9–71.8)
Change of living place between 1991 and 1995	yes	37.4 (25.1–51.6)	16.4 (9.0–27.8)	46.3 (33.8–59.2)
	no	17.8 (14.4–21.8)	10.8 (8.1–14.3)	71.4 (66.8–75.6)
Estimate of household economic status	worse than average	18.6 (14.3–23.8)	12.1 (8.7–16.7)	69.3 (63.4–74.6)
	average	22.9 (17.3–29.7)	10.8 (7.1–15.9)	66.3 (59.1–72.8)
	better than average	26.4 (2.2–85.2)	0	73.6 (14.8–97.8)

**TABLE 5**  
DISTRIBUTION OF SMOKING PATTERNS AMONG WOMEN 18–34 YEARS BY SOCIO-DEMOGRAPHIC CHARACTERISTICS

Women 18–34 years	Heavy Smokers	Light Smokers	Non-Smokers	
	% (95% CI)	% (95% CI)	% (95% CI)	
Education	low	26.3 (17.0–38.3)	39.3 (27.5–52.5)	34.4 (23.5–47.2)
	middle	20.4 (16.4–25.1)	46.1 (40.6–51.8)	33.5 (28.4–39.0)
	high	12.6 (6.3–23.5)	47.5 (35.3–60.0)	39.9 (28.5–52.6)
Monthly household income	< 385 USD	23.2 (14.4–35.3)	50.7 (37.4–64.0)	26.0 (16.3–38.8)
	385–1.154 USD	19.7 (16.0–23.9)	44.5 (39.5–49.6)	35.9 (31.2–40.9)
	> 1.154 USD	0	0	0
Married or living in partnership	yes	20.0 (15.9–24.9)	43.4 (37.7–49.4)	36.6 (31.1–42.4)
	no	20.4 (14.9–27.3)	47.9 (40.1–55.8)	31.7 (24.9–39.4)
Employment	yes	21.7 (16.6–28.0)	45.8 (39.0–52.9)	32.4 (26.5–39.0)
	no	18.8 (14.5–24.0)	44.9 (38.5–51.5)	36.3 (30.2–42.9)
Change of living place between 1991 and 1995	yes	18.8 (12.4–27.5)	39.4 (30.6–48.9)	41.9 (33.0–51.3)
	no	20.5 (16.6–25.0)	46.8 (41.4–52.3)	32.7 (27.7–38.0)
Estimate of household economic status	worse than average	22.5 (18.2–27.6)	45.9 (40.2–51.7)	31.6 (26.5–37.1)
	average	15.1 (10.3–21.5)	44.9 (36.5–53.6)	40.0 (32.0–48.6)
	better than average	42.5 (4.4–92.2)	0	57.5 (7.8–95.6)

**TABLE 6**  
DISTRIBUTION OF SMOKING PATTERNS AMONG WOMEN 35–64 YEARS BY SOCIO-DEMOGRAPHIC CHARACTERISTICS

Women 35–64 years	Heavy Smokers	Light Smokers	Non-Smokers	
	% (95% CI)	% (95% CI)	% (95% CI)	
Education	low	28.8 (23.5–34.6)	29.6 (24.6–35.0)	41.7 (36.0–47.6)
	middle	28.5 (24.8–32.5)	32.2 (28.4–36.2)	39.3 (35.3–43.5)
	high	27.1 (20.7–34.6)	32.4 (25.5–40.0)	40.6 (33.3–48.2)
Monthly household income	< 385 USD	34.4 (28.0–41.4)	31.3 (25.3–38.1)	34.3 (27.7–41.5)
	385–1.154 USD	26.9 (23.9–30.2)	31.5 (28.4–34.8)	41.6 (38.2–45.1)
	> 1.154 USD	0	0	0
Married or living in partnership	yes	26.8 (23.7–30.1)	31.5 (28.3–34.8)	41.7 (38.3–45.3)
	no	36.4 (30.4–42.9)	31.3 (25.6–37.6)	32.2 (26.6–38.5)
Employment	yes	27.1 (23.1–31.4)	32.0 (27.9–36.4)	40.9 (36.5–45.5)
	no	29.5 (25.7–33.6)	31.0 (27.2–35.0)	39.5 (35.4–43.8)
Change of living place between 1991 and 1995	yes	33.2 (25.8–41.5)	29.3 (22.6–37.0)	37.5 (29.7–46.2)
	no	27.6 (24.6–30.8)	31.8 (28.8–35.0)	40.6 (37.3–43.9)
Estimate of household economic status	worse than average	29.8 (26.5–33.3)	32.4 (29.1–35.8)	37.8 (34.4–41.4)
	average	24.8 (19.7–30.6)	28.5 (23.2–34.4)	46.4 (40.5–53.1)
	better than average	12.7 (1.6–57.4)	64.5 (21.4–92.4)	22.8 (3.0–73.5)

while about 30% were non-smokers (Table 5). Highest proportion of non-smokers was found in a group with household economic status that are better than average. Same was found in the youngest group of men. Among women 35 years and older there are more non-smokers than smokers, and if they are smoking than it is dominantly light smoking (Table 6 and 7).

## Discussion

We found a significant difference in the prevalence of heavy smoking according to gender. The prevalence of heavy smoking was higher in men than women in all age groups. The analyzed socio-demographic variables have a larger influence on heavy smokers amongst men aged

**TABLE 7**  
DISTRIBUTION OF SMOKING PATTERNS AMONG WOMEN 65 YEARS AND OLDER BY SOCIO-DEMOGRAPHIC CHARACTERISTICS

Women ≥65 years	Heavy Smokers	Light Smokers	Non-Smokers	
	% (95% CI)	% (95% CI)	% (95% CI)	
Education	low	14.4 (9.2–21.9)	31.8 (23.6–41.3)	53.8 (44.8–62.6)
	middle	21.3 (13.4–32.1)	21.3 (14.0–31.0)	57.4 (46.2–68.0)
	high	20.1 (9.2–38.7)	12.0 (3.8–32.1)	67.9 (48.6–82.5)
Monthly household income	< 385 USD	14.9 (7.9–26.2)	24.7 (15.1–37.8)	60.4 (47.3–72.2)
	385–1.154 USD	17.5 (12.4–24.1)	27.4 (20.6–35.4)	55.2 (47.3–62.8)
	>1.154 USD	0	0	0
Married or living in partnership	yes	16.2 (9.6–25.9)	29.2 (18.5–42.7)	54.6 (42.5–66.3)
	no	17.7 (12.2–24.9)	23.8 (18.2–30.5)	58.5 (50.8–65.8)
Employment	yes	29.8 (7.6–68.7)	32.4 (5.9–78.5)	37.8 (9.1–78.6)
	no	16.2 (11.9–21.8)	26.6 (20.8–33.3)	57.2 (50.4–63.7)
Change of living place between 1991 and 1995	yes	16.4 (6.8–34.6)	29.3 (15.9–47.6)	54.3 (36.6–71.0)
	no	17.2 (12.5–23.2)	25.4 (19.4–32.5)	57.4 (50.2–64.3)
Estimate of household economic status	worse than average	17.2 (12.2–23.7)	24.7 (18.0–32.8)	58.2 (50.2–65.7)
	average	16.2 (8.5–28.6)	32.6 (21.6–45.9)	51.2 (38.1–64.2)
	better than average	0	100	0

35–64. Marital status, low education and income (average estimate of household economic status, and income lower than 385USD) affect the prevalence of heavy smoking amongst men aged 18–34. That is similar to recent researches that have also shown that communities with a lower median household income had significantly higher proportions of daily smokers and also had higher average daily cigarettes consumption<sup>15</sup>. We found an association of smoking and lower education in heavy smoking men aged 18–34, as found in build-ups until now<sup>16,17</sup>. Marital status, unemployment, low education, migrations, and income (better than average estimate of household economic status, and higher income) are related to higher prevalence of heavy smoking in men. The opposite effect of migrations can be found in already published papers<sup>18</sup>. Gender and age have a larger influence on the heavy smoking habit amongst women than the other analyzed variables. Education and income have a smaller connection with smoking amongst women contrary to results for men. In women aged 18–34 there were more light smokers than heavy smokers, while in the age group 35–64 there was no significant difference between the prevalence of heavy and light smoking except for the women who estimated their economic household status better than average where more than 2/3 reported light smoking. Women aged 65 or older, lower educated and unemployed, had a smallest prevalence of heavy smokers.

This paper shows a visible difference in the socio-demographic characteristics of heavy smokers according to gender. Positive correlates of heavy smoking are gender (male), age (35–64), low education, married or living in partnership, unemployment, income lower than 385\$, and migrations during the war (in men aged 65 or older and women aged 30–64).

## Conclusion

The Croatia has a long history of preventive medicine. The activities of a no-smoking school have been operating for the past 30 years. The campaign »Say YES to no smoking« was implemented in 2002. By ratifying the Framework Convention for Tobacco Control (FCTC), Croatia will integrate European tobacco bans: restricted areas for smokers, limitation of tar and nicotine levels, and advertising forbidden throughout the country. While planning future interventions in the population, we must consider all of these characteristics and influences, and engaging all segments of society.

## Acknowledgments

This study was supported by the Croatian Ministry of Science, Education and Sports grant no. 108-1080135-0264.

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## KARAKTERISTIKE TEŠKIH PUŠAČA U HRVATSKOJ

### SAŽETAK

Svrha ovog rada bila je istražiti socio-demografske karakteristike teških pušača u odnosu na lake pušače te ih usporediti s nepušačima. Podaci korišteni u radu dobiveni su iz Hrvatske zdravstvene ankete (HZA 2003). Rezultati su ukazali na značajnu razliku u proporciji teških pušača među pušačima u odnosu na spol. Zastupljenost teških pušača je veća među muškarcima u svim dobnim skupinama. Najveća proporcija teških pušača je nađena u dobnj supini od 35 do 64 godine u oba spola. U odnosu na analizirana socio-demografska obilježja, muškarci niskog obrazovanja i prihoda te s iskustvom promjene mjesta stanovanja imaju najvišu prevalenciju teškog pušenja. U žena pušača obrazac je drugačiji. Većina žena pušača su laki pušači. Među ženama iznadprosječnog ekonomskog statusa kućanstva ima više pušača nego nepušača, među njima je izrazito visoka zastupljenost teških pušača u mlađoj dobnj skupini od 18 do 34 godine a visoka zastupljenost lakih pušača u dobi od 35 do 64 godine. U planiranju intervencija u ovoj populaciji potrebno je uzeti u obzir sve karakteristike pojedinih grupa pušača i u borbu protiv pušenja uključiti sve segmente društva.