Five-Year Cumulative Incidence of Smoking in Adult Croatian Population: the CroHort Study

Senka Samardžić1, Gorka Vuletić2 and Domagoj Tadijan3

1 Institute of Public Health for the Osijek-Baranja County, Department of Social Medicine, Osijek, Croatia
2 »J. J. Strossmayer« University, Faculty of Philosophy, Department of Psychology, Osijek, Croatia
3 »J. J. Strossmayer« University, Faculty of Medicine Osijek, Osijek, Croatia

ABSTRACT

The aim of this paper is to investigate the incidence of smoking and changes in smoking habits in Croatia during a 5-year period. Data from the Croatian Adult Health Study of 2003 and 2008 was used for the study (N=3229). The results of this study suggest that the incidence of smoking is the highest in youngest men and decreases with age. In ages 35 to 64 and older than 65 the incidence was higher in women than men. The cumulative smoking incidence is low in Croatia, but particularly alarming is a higher incidence in women than in men.

Key words: smoking incidence, risk factor, CroHort Study

Introduction

Tobacco smoke contains around 4,800 compounds, of which about 100 are carcinogenic, mutagenic or have tumour promoter properties1. Smoking is the main risk factor in developing malignant diseases2–9. Smoking doubles the risk of death caused by cardiovascular diseases, and 30–40% of all deaths caused by coronary diseases are attributed to smoking10. Smoking is a socially accepted behavior in Croatia and every third citizen is a smoker11. The CAHS study 2003 suggested regional difference in smoking prevalence and prevalence were higher in men12. 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 forbidden advertising throughout the country. The participants of the CAHS study were followed in a 5-year period. Data was used to show a cumulative 5-year smoking incidence by age group and gender. Given the preventive activities and the campaign against smoking, we expected a low incidence of smoking.

Material and Methods

Data from the Croatian Adult Health Survey (CAHS) was used in this study. CAHS is a cross-sectional survey which provided the basis for the calculation of representative estimates for a number of health related risk factors13,14. A multistage stratified sample design was used to draw a representative sample of general adult population. The survey targeted people aged ≥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 survey15. In total, 10766 households were selected to participate in the 2003 CAHS. Response was obtained from 9070 individuals, which gave the overall response rate of 84.3%. Public health nurses trained in face-to-face interviews13 administered the questionnaire. Survey results were representative of the regional, sex, and age structure of the Croatian adult population. Out of the 9070 individuals included in CASH 2003, 3230 participated in CroHort Study.

Statistical Analysis

Respondents were divided into three groups (smokers, former smokers and non-smokers), to help analyze changes in smoking status. We calculated incidence as the number of respondents who were nonsmokers in 2003, and began smoking by 2008. The recidivists were respondents who were former smokers in 2003, and began

Received for publication September 1, 2011
smoking by 2008. Contingency tables were used in the analysis. All confidence intervals (CI) were calculated with 95% probability levels. The software SAS for Windows (version 8.2, SAS Institute Inc, Cary, NC) was used for the analysis.

### Results

Smoking prevalence in men decreased from 2003 (34.1%) to 2008 (25.3%). The highest smoking prevalence was among men younger than 35 and decreases with age. In 2003 48.5% of men younger than 35, and 32.1% in 2008 were smokers (Table 1 & 3). In the same period the share of former smokers and non-smokers was increased (former smokers from 34.7% in 2003 to 41.6% in 2008; non-smokers from 31.2% in 2003 to 33.0% in 2008) (Table 1 & 3).

Prevalence of smoking among women has not changed significantly (22.5% in 2003 and 22.4% in 2008) (Table 2 & 4). Prevalence of smoking among women decreases in age groups under 35, and increases in groups aged 35–64, and older than 65. In this period the proportion of former smokers increased from 16.1% in 2003 to 22.5% in 2008 and reduced the proportion of nonsmokers from 61.4% in 2003 to 55.0% in 2008 (Table 2 & 4). The least women smokers are younger than 35 and that proportion increases with age. Such a distribution is the same in 2003 and 2008 (Table 2 & 4).

Smoking incidence was highest in the women age group 35–64 (3.1%, 95%CI=2.31–3.87) (Table 5). In men the highest incidence is in younger than 35, and decreases with age. In the age group 35 to 64 and older than 65 the incidence was higher in women than in men (3.1% in women vs. 1.2% in men and 1.4% in women vs. 0.6% in men) (Table 5). The cumulative smoking incidence was higher in women (2.3%, 95%CI=1.8–2.76) than in man (1.1%, 95%CI=0.42–1.8) (Table 5).

In men there were a greater number of those who have stopped smoking in the 5-year period (9.8%, 95%CI=7.92–11.64 in men and 9.1%, 95% CI=7.59–10.63 in women) (Table 6). In the age group younger than 35 the percent of respondents who had stopped smoking is the same in both genders. Men stopped smoking more often than women in the age group 35–64, and less than women in the age group older than 65 (Table 6).

Most former smokers who started smoking again are younger than 35 (6.3%, 95%CI=0.6–13.1 in men and 7.9%, 95%CI=3.22–12.66 in women) (Table 7). Women in

### TABLE 1

DISTRIBUTION OF MEN ACCORDING TO SMOKING STATUS IN 2003

<table>
<thead>
<tr>
<th></th>
<th>Non smokers</th>
<th>Former smokers</th>
<th>Smokers</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>&lt;35</td>
<td>75</td>
<td>31.4</td>
<td>48</td>
<td>20.1</td>
</tr>
<tr>
<td>35–64</td>
<td>515</td>
<td>30.1</td>
<td>520</td>
<td>30.4</td>
</tr>
<tr>
<td>65+</td>
<td>308</td>
<td>33.0</td>
<td>432</td>
<td>46.4</td>
</tr>
<tr>
<td>All age</td>
<td>898</td>
<td>31.2</td>
<td>1,000</td>
<td>34.7</td>
</tr>
</tbody>
</table>

### TABLE 2

DISTRIBUTION OF WOMEN ACCORDING TO SMOKING STATUS IN 2003

<table>
<thead>
<tr>
<th></th>
<th>Non smokers</th>
<th>Former smokers</th>
<th>Smokers</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>&lt;35</td>
<td>261</td>
<td>41.6</td>
<td>126</td>
<td>20.1</td>
</tr>
<tr>
<td>35–64</td>
<td>1,875</td>
<td>53.2</td>
<td>654</td>
<td>18.6</td>
</tr>
<tr>
<td>65+</td>
<td>1,643</td>
<td>81.9</td>
<td>214</td>
<td>10.7</td>
</tr>
<tr>
<td>All age</td>
<td>3,779</td>
<td>61.4</td>
<td>994</td>
<td>16.1</td>
</tr>
</tbody>
</table>

### TABLE 3

DISTRIBUTION OF MEN ACCORDING TO SMOKING STATUS IN 2008

<table>
<thead>
<tr>
<th></th>
<th>Non smokers</th>
<th>Former smokers</th>
<th>Smokers</th>
<th>All</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>&lt;35</td>
<td>17</td>
<td>32.1</td>
<td>19</td>
<td>35.8</td>
</tr>
<tr>
<td>35–64</td>
<td>173</td>
<td>31.3</td>
<td>207</td>
<td>37.5</td>
</tr>
<tr>
<td>65+</td>
<td>119</td>
<td>36.1</td>
<td>163</td>
<td>49.4</td>
</tr>
<tr>
<td>All age</td>
<td>309</td>
<td>33.0</td>
<td>389</td>
<td>41.6</td>
</tr>
</tbody>
</table>
the youngest age group started smoking again more often than men. Women aged 35 to 64 started smoking more often than men (6.1% in women vs. 3.7% in men) (Table 7).

If we analyze the distribution of smoking habits by gender, we can say that only 21.8% of men and 48.2% of women had never smoked, while others are smokers or former smokers (Table 8 & 9). The proportion of people who never smoked was highest in the oldest age group and decreases towards the younger age in both genders.

The largest proportion of recidivists was in the youngest age group and decreases with age in both genders. Men were more often recidivists than women in the age group older than 65 (Table 8 & 9).

The proportion of former smokers was lowest in the age group younger than 35 (29.4%) and increases with age in men (36.5% in age 35–64 and 54.8% older than 65). The opposite pattern was present in women where the proportion was highest among younger than 35 (26.9%) and decreases with age (24.6% in age 35–64 and 18.8% older than 65) (Table 8 & 9).

From 2003 to 2008 10.3% of men and 6.4% of women had stopped smoking. Smoking cessation was the most common in the age group younger than 35 in both genders (Table 8 & 9).
Discussion

In Croatia 2003 there were more than one million smokers in a country of only four million residents\textsuperscript{17}. In comparison to 1997 there has been a reduction in the frequency of smokers among both genders\textsuperscript{13,17}. The intensive antismoking campaigns, legislation and restricting smoking had an impact on citizens’ attitudes toward smoking\textsuperscript{18}. This trend is probably influenced a significant proportion of smokers who quit in five years. According to the data we can say that every tenth smoker has tried to quit smoking. Smoking prevalence is higher in men\textsuperscript{19}, and men are more likely to stop smoking\textsuperscript{20}. The reduction in smoking prevalence among men in the period of 2003 to 2008 is probably the result of the implementation of non-specific and comprehensive public health measures, which had no effect in middle aged and elderly women. The question is why are the implemented measures better suited for men? 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. According to the Ministry of Health of Croatia only 50 mandatory penalties for violation of the Act restricting the use of tobacco products were handed down by an inspection in the last year. Better law enforcement would certainly contribute to further reducing the prevalence of smoking.

Although there are a significant number of recidivists, we hope that at least some respondents who quit smoking will not return to this habit. When the number of recidivists is subtracted from the number of smokers who quit smoking, we get a significant share of those who do not return to this habit, approximately 3.6% of women and 6.9% of men. Although there are many benefits of quitting for health\textsuperscript{21–23}, smokers lack the motivation to quit smoking. Smoking cessation and recidivism of smoking is most common in young people, who do not have firmly established smoking habits. This is precisely the age group we should provide support for smoking cessation to, as well as intensify the anti-smoking campaign in this age group. In the age group older than 65 there is a higher proportion of smokers who stop smoking, probably caused by health problems, as previous research has shown\textsuperscript{24}.

The cumulative smoking incidence was higher in women than in man, and in women in the age group 35–64. In men the highest incidence is in the age group younger than 35, and decreases with age. Researchers have published data that confirms a higher incidence of smoking, but mainly in the age group younger than 18 years\textsuperscript{25,26}. Smoking incidence was also higher in young men\textsuperscript{17}. By searching existing data bases we did not find published data on the incidence in older age groups.

Conclusion

The cumulative smoke incidence is low in Croatia. But particularly alarming is a higher incidence in women than in men. The changes in smoking status tell us about a significant proportion of smokers who have a desire to quit smoking. All segments of society should continue the fight against smoking. It is needed to better organize support for smokers who want to quit smoking, and expand and improve the network of «Schools of no smoking».

Acknowledgements

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

\begin{table}[h]
\centering
\caption{SMOKING INCIDENCE AND DISTRIBUTION OF MEN ACCORDING TO SMOKING STATUS, CHANGE IN STATUS}
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|}
\hline
Incidence & Smokers & Smokers '03 & Nonsmokers & Nonsmokers '03 & Former smokers & Former smokers '03 & Sum \\
& '03 & '08 & '03 & '08 & '03 & '08 & & & \\
\hline
<35 & 2 & 3.9 & 12 & 23.5 & 11 & 21.6 & 8 & 15.7 & 3 & 5.9 & \textsuperscript{15} & \textsuperscript{29.4} & \textsuperscript{51} & \textsuperscript{100.0} \\
35–64 & 6 & 1.1 & 146 & 26.5 & 65 & 11.8 & 114 & 20.7 & 19 & 3.4 & \textsuperscript{201} & \textsuperscript{36.5} & \textsuperscript{551} & \textsuperscript{100.0} \\
65+ & 2 & 0.6 & 36 & 10.9 & 20 & 6.1 & 81 & 24.5 & 10 & 3.0 & \textsuperscript{181} & \textsuperscript{54.8} & \textsuperscript{330} & \textsuperscript{100.0} \\
All age & 10 & 1.1 & 194 & 20.8 & 96 & 10.3 & 203 & 21.8 & 32 & 3.4 & \textsuperscript{397} & \textsuperscript{42.6} & \textsuperscript{932} & \textsuperscript{100.0} \\
\hline
\end{tabular}
\end{table}

\begin{table}[h]
\centering
\caption{SMOKING INCIDENCE AND DISTRIBUTION OF WOMEN ACCORDING TO SMOKING STATUS, CHANGE IN STATUS}
\begin{tabular}{|c|c|c|c|c|c|c|c|c|c|}
\hline
Incidence & Smokers & Smokers '03 & Nonsmokers & Nonsmokers '03 & Former smokers & Former smokers '03 & Sum \\
& '03 & '08 & '03 & '08 & '03 & '08 & & & \\
\hline
<35 & 5 & 3.4 & 31 & 21.4 & 23 & 15.9 & 37 & 25.5 & 10 & 6.9 & \textsuperscript{39} & \textsuperscript{26.9} & \textsuperscript{145} & \textsuperscript{100.0} \\
35–64 & 58 & 4.9 & 241 & 20.2 & 81 & 6.8 & 478 & 40.1 & 40 & 3.4 & \textsuperscript{293} & \textsuperscript{24.6} & \textsuperscript{1,191} & \textsuperscript{100.0} \\
65+ & 23 & 3.7 & 26 & 4.2 & 22 & 3.5 & 429 & 69.1 & 4 & 0.6 & \textsuperscript{117} & \textsuperscript{18.8} & \textsuperscript{621} & \textsuperscript{100.0} \\
All age & 86 & 4.4 & 298 & 15.2 & 126 & 6.4 & 944 & 48.2 & 54 & 2.8 & \textsuperscript{449} & \textsuperscript{22.9} & \textsuperscript{1,957} & \textsuperscript{100.0} \\
\hline
\end{tabular}
\end{table}


PETOGODIŠNJA INCIDENČNA PUŠENJA ODRASLE POPULACIJE HRVATSKE – CROHORT STUDIJA

SAŽETAK


REFERENCES


Institute of Public Health for the Osijek-Baranja County, F. Kreåme 1, 31000 Osijek, Croatia

e-mail: Senka.Samardzic@zzjzosijek.hr

36
103