

## Smoking-related Attitudes, Behaviors and Cessation Efforts among Coronary Heart Disease Patients in Hungary

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### Abstract

**Background:** Smoking is a serious public health problem in Hungary, where at least 25% of people smoke daily and cardiovascular disease (CVD) is a leading cause of mortality of older adults. Smoking cessation is the most effective way to prevent cardiovascular disease, but many patients with CVD continue smoking after hospital discharge.

**Objective:** The purpose of this study was to reveal the factors, including demographics, socioeconomic status, and psychosocial barriers, that are related to persistent smoking after a diagnosis of coronary heart disease (CHD), a type of CVD.

**Methodology:** This study used a descriptive cross-sectional design and included 315 cardiac patients engaged in a comprehensive, outpatient cardiological rehabilitation (CR) program in Sopron, Hungary. All patients were diagnosed with coronary heart disease (CHD) at least 6 months prior to study commencement. Data were collected at the 3<sup>rd</sup> week of admission for the inpatient sample and after 12 weeks of discharge for the outpatient sample.

**Results:** The study sample consisted of smokers (54%), former smokers (25%), and nonsmokers (21%). Smokers had a significant reduction in cigarettes smoked after the CHD diagnosis (22 vs. 14,  $p < 0.05$ ). Negative health effects ( $n=225$ ), doctor's orders ( $n=205$ ), and cigarette cost ( $n=173$ ) were the main self-reported reasons for smoking reduction. The biggest barriers to smoking cessation were missing of cigarettes ( $M=2.9$ ,  $SD=1.6$ ), withdrawal symptoms ( $M=2.8$ ,  $SD=1.4$ ), weight gain ( $M=2.4$ ,  $SD=1.6$ ), fear of failing to quit ( $M=2.2$ ,  $SD=1.5$ ), and encouragement from family members to smoke ( $M=2.2$ ,  $SD=1.5$ ). In regression model for barriers to cessation, social support significantly predicted perceived barriers ( $t=-2.53$ ,  $p=0.0121^*$ ), emotional wellbeing ( $t=-2.21$ ,  $p=0.0280^*$ ), work stress ( $t=3.01$ ,  $p=0.0029^*$ ), and household stress ( $t=2.55$ ,  $p=0.0114^*$ ). In regression models for desire and confidence to quit smoking, social support significantly predicted desire ( $t=2.66$ ,  $p=0.0086^*$ ) and confidence ( $t=3.75$ ,  $p=0.0002^*$ ) to quit smoking.

**Conclusion:** Given these findings, it is likely that nicotine dependence plays a strong role in persistent tobacco use after CHD diagnosis. These findings support those of other similar studies and may lead to the development of effective cessation interventions for patients who smoke and suffer from cardiovascular disease.

**Keywords:** Smoking; Tobacco; Smoking cessation; Cardiovascular disease; Coronary heart disease; Prevention; Attitude; Behavior; Hungary

### Introduction

Cardiovascular disease (CVD), which is a class of diseases that compromise heart or blood vessel function and may lead to heart attack or stroke, is a rapidly growing health problem around the world. Presently, it accounts for approximately 31% of deaths per year globally [1,2] and is the primary cause of mortality of both men and women in the European Union [3]. Indeed, the World Health Organization estimates that the number of people who will die from CVD will increase from 16.7 million in 2002 to 23.3 million by 2030 [1,4] if appropriate preventative measures are not taken. Along with other

unhealthy lifestyle behaviors, such as physical inactivity, alcohol consumption, and a diet low in fruits and vegetables, smoking is a significant contributor to the development of CVD, especially in Eastern European countries like Hungary [5], where smoking is a cultural norm. Of concern to public health researchers are the recent findings of the Hungary Adult Tobacco Survey [6], which revealed that 33.8% of men and 23.6% of women in Hungary smoke daily, and report no intentions to cease smoking despite awareness of the health risks. These findings indicate that knowledge about the health risks of smoking is not enough to help smokers quit, and effective smoking cessation interventions are needed to prevent an epidemic of CVD in Hungary [7].

A strong body of evidence demonstrates that smoking cessation is the easiest way to reduce the risk of coronary heart disease (CHD), a type of CVD, and it is more effective than any other medical treatment

for secondary prevention of CHD [8]. However, despite the strong correlation between smoking and CHD, about one third (29%) of cardiac patients in Hungary continue to smoke after discharge from the hospital [7,9], significantly increasing their risk of death from CHD over time. Thus, the purpose of this study was to reveal the factors, including demographics, socioeconomic status, and psychosocial barriers, that are related to persistent tobacco use after a diagnosis of CHD. Findings may provide the basis for effective cessation interventions for patients who suffer from CHD and indicate that they would like to quit smoking.

## Methodology

### Design

This study used a descriptive cross-sectional design, included 315 CHD patients who smoke, and entailed the completion of a written questionnaire.

### Setting

The study sample was recruited from a comprehensive cardiological rehabilitation (CR) program at the State Rehabilitation Institute of Sopron in Sopron, Hungary. This institute, which is the second largest cardiological rehabilitation institute in Hungary, has 238 beds and admits patients from around the country. The CR inpatient program consists of pharmacological therapy and the prescription of healthy lifestyle behaviors, including regular exercise, avoidance of alcohol, and the consumption of a diet high in fruits and vegetables. Patients who smoke are advised to attend smoking cessation classes, which may be conducted in group or individual sessions by a skilled staff member. Patients eligible for the CR program may have conditions or procedures, including: heart failure, chronic stable angina, coronary revascularization, coronary heart disease, acute myocardial infarction (AMI), peripheral arterial disease, coronary artery bypass graft (CABG), percutaneous coronary interventions (PCI) or other cardiac surgery, and other high risk groups for CHD.

### Sample

The study sample consisted of 315 patients from both inpatient and outpatient settings of the State Rehabilitation Institute. All patients had been angiographically diagnosed with CHD at least 6 months prior to study commencement. Data were collected at the third week of admission for the inpatient sample and 12 weeks after discharge for the outpatient sample.

Patients were included in the study if they were older than 40 years of age and identified as previous or persistent smokers. The study utilized a wide margin for age criteria because CHD typically affects adults over 40, and the main cause of death in this age group in Hungary is CHD [3].

The sample size was calculated using the analysis program 'EpiCalc 200 version 3.0', which assumes that the expected percentage of cigarette smoking is 35%, given a level of significance of 0.05 and 95% confidence interval among CHD patients.

### Protection of human subjects

The Rehabilitation Institute of Sopron Cardiac Rehab Center's Institutional Review Board (IRB) approved the study prior to its commencement. During the recruitment phase, a member of the

research team carefully explained the study's purpose and procedures to participants, and patients who agreed to participate were asked to review and sign informed consent forms. A member of the research team emphasized to participants that their involvement in the study was voluntary and that they could withdraw at any time. To ensure participants' privacy, coding numbers were used with patients' medical records, and any link between the code numbers and patient names was destroyed. To further ensure the privacy of participants, only aggregated data that did not contain identifying information were reported in the results.

### Measurement

**The self-report questionnaires consisted of four major components:** Demographics/Psychosocial Questionnaire included items for age; gender; height; weight; marital status; levels of education; current work responsibilities; the presence of cardiovascular risk factors, including diabetes mellitus, hypertension, hyperlipoproteinemia, and physical activity; and feelings of social support and emotional well-being. Work and household stress were also measured using a visual analog scale from 0 (poor) to 10 (excellent). Items also inquired about the presence of emotional problems and the need for medication to address these problems.

**Tobacco use questionnaire (TUQ):** This 19-item questionnaire covers smoking habits and history, smokeless tobacco use, past attempts to quit smoking, attitudes and beliefs towards tobacco use, and the current desire to quit. The last four questions asked participants if they were "planning on decreasing their tobacco use in the next week, month, six months, or one year" and "whether he/she is trying to stop smoking". The questionnaire was previously used by Haddad et al. [10], and it showed a high level of validity and reliability [10], and an internal consistency of 0.79.

**Fagestrom test for nicotine dependence questionnaire (FTND):** This 6-item scale measures nicotine dependence in cigarette smokers [11] and is considered highly valid [12,13]. A valid and reliable Hungarian version of the FTND was used in this study.

**Cessation barriers questionnaire:** The Barriers to Cessation Scale (BCS) consists of 19 items, and three subscales per item: The Addiction Barriers Subscale (8 items), The External Barriers Subscale (7 items), and the Internal Barriers Subscale (3 items) [14]. Overall, the scale (19 items) demonstrated good internal consistency in the study sample with Cronbach  $\alpha=0.814$ . The instrument was translated from English to Hungarian and then from Hungarian to English. Items reflecting addiction barriers include "having withdrawal symptoms" and "feeling addicted to tobacco", and items reflecting external barriers include "no encouragement or help from family members" and "seeing things or people which remind you of smoking." Finally, items reflecting internal barriers include "gaining weight" and "feeling less in control of your moods" [14].

### Data collection procedures

All patients who agreed to participate were interviewed for 20-30 minutes in the CR outpatient clinic by designated members of the study team. A structured interview was used to ensure the collection of self-reported data and comprehension of the questionnaire. After the interview was completed, data were obtained from the medical records to verify the diagnosis of CHD and related health problems.

## Data analysis

Data were analyzed using JMP version 10 statistical packages. Descriptive statistics were performed to describe all variables.

## Results

The patients' sample mean age was 62.5 years old with a standard deviation of 9.0 years. Males comprised 56% of the sample. Most patients in the sample were married (57%) and had a high school diploma or higher (67%); 54% of patients were persistent smokers after their diagnosis with CHD. Further characteristics of the sample are available in Table 1.

Demographics	
Age (mean, SD)	62.5, 9.0
Male (%)	56.2
Female (%)	43.8
Tobacco use (%)	54
Marital status (%)	
Single	20.8
Married	56.9
Other	22.0
Education (%)	
Less than high school	32.2
High school diploma	45.3
Some college or more	22.1
Employment (%)	
Blue collar	58.6
White collar	41.1
Tobacco type used (n=169)	
Cigarettes	169 (100%)
Cigar	7 (4.1%)
Pipe	8 (4.7%)
Smokeless	2 (1.1%)
FTND	
Mean (SD)	3.9 (1.9)
Highly dependent ( $\geq 4$ )	13 (14%)
Less dependent ( $<4$ )	71 (78%)

**Table 1:** Sample characteristics (N=315).

## Smoking behavior

Current smokers were defined as patients who reported smoking at time of CHD diagnosis. Data analysis revealed that current smokers comprised 54% (n=169) of participants. Of the current smokers,

approximately 56% (n=95) were men and 44% (n=74) were women. Former smokers were defined as patients with a smoking history who were not smoking at time of CHD diagnosis; this group accounted for 25% of the whole sample (n=79). Nonsmokers, who were defined as patients with no history of cigarette smoking, comprised 21% of the participants (n=67).

In the current smoking group, participants smoked a mean number of N=22 (SD 18.3) cigarettes per day before CHD diagnosis and N=14 (SD=10.4) cigarettes per day after CHD diagnosis. A significant difference existed between the number of cigarettes smoked before CHD diagnosis,  $t(98)=15.0$ , P occurrence ( $<0.05$ ), and after the diagnosis of CHD,  $t(98)=10.23$ ,  $p<0.05$ .

## Reasons to quit smoking after CHD diagnosis

Two hundred and sixty-seven participants identified the reasons that encouraged them to quit smoking after CHD diagnosis; the most frequent reasons were 'the effect of smoking on my health' 84% (n=225), 'my doctor told me to stop or cut down', 77% (n=205) and 'cost of cigarettes' 65% (n=173). The least frequent reasons were 'being a bad example regarding the dangers of smoking' 11.6% (n=31), 'improve my sense of taste or smell' 16%, (n=43), and 'messiness or dirtiness of the habit' 19.5% (n=52) (Table 2).

Reason to quit smoking	Numbers	Percentage (%)
Cost of cigarettes	173	65
Improve my sense of taste or smell	43	16
Messiness or dirtiness of the habit	52	19.5
The effect of smoking on my health	225	84
Having my doctor tell me to stop or cut down	205	77
Scientific reports on the dangers of smoking	84	31.5
Being a bad example regarding the dangers of smoking	31	11.6
Having spouse or family members want me to stop or cut down	89	33.3
Not really enjoying smoking	7	2.5

**Table 2:** Reasons to quit smoking (N=267).

## Overall barriers to smoking cessation for CHD patients

The scores for the overall barriers for the total sample ranged from 19 to 87 (mean=41.1, SD=13.6). Table 3 shows the scores for the five strongest and weakest barriers to smoking cessation. The strongest barrier was "missing cigarettes" (mean=2.9; SD=1.6) whereas the weakest barrier was "feeling depressed" (mean=1.7, SD=1.2). Other strong barriers included: "having withdrawal symptoms", "gaining weight", "fear of failing to quit", and "family member encouraging me to smoke". Among the weakest barriers were: "thinking about tobacco all of the time", "feeling lost without tobacco", "feeling bored", and "feeling depressed".

### Correlation between psychological traits and ratings of barriers to cessation

Multiple regression analysis was used to test if the four assessed psychological traits significantly predicted participants' ratings of "barriers to cessation", "desire to quit smoking", and "confidence to quit smoking" after diagnosis with CHD. The results of the regression for "barriers to cessation" indicated that the four predictors explained 14.2% of the variance ( $R^2=0.14$ ,  $F(4,259)=10.66$ ,  $p<0.0001^*$ ). In addition, results revealed that social support significantly predicted "perceived barriers" ( $t=-2.53$ ,  $p=0.0121^*$ ), "emotional wellbeing" ( $t=-2.21$ ,  $p=0.0280^*$ ), "work stress" ( $t=3.01$ ,  $p=0.0029^*$ ), and "household stress" ( $t=2.55$ ,  $p=0.0114^*$ ).

Item	Mean	SD
Highest scoring barriers		
Missing cigarettes	2.9	1.6
Having withdrawal symptoms	2.8	1.4
Gaining weight	2.4	1.6
Fear of failing to quit	2.2	1.5
Family member encouraging to smoke	2.2	1.5
Lowest scoring barriers		
Starting the day without tobacco	1.2	1.4
Thinking about tobacco all the time	1.4	1.2
Feeling lost without tobacco	1.5	1.2
Feeling bored	1.5	1.3
Feeling depressed	1.7	1.2

**Table 3:** Overall barriers to smoking cessation (N=267).

The results of the regression for "desire to quit smoking" indicated that only social support explained 6.7% of the variance ( $R^2=0.06$ ,  $F(4,174)=3.13$ ,  $p=0.0162^*$ ). It was found that social support significantly predicted "desire to quit smoking" ( $t=2.66$ ,  $p=0.0086^*$ ), but not "emotional wellbeing" ( $t=-0.01$ ,  $p=0.9952$ ), nor "work stress" ( $t=0.07$ ,  $p=0.9457$ ) or "household stress" ( $t=1.61$ ,  $p=0.1089$ ).

The results of the regression for "confidence to quit smoking" indicated that only "social support" explained 14.5% of the variance ( $R^2=0.14$ ,  $F(4,195)=8.30$ ,  $p<0.0001^*$ ). Indeed, "social support" significantly predicted "confidence to quit smoking" ( $t=3.75$ ,  $p=0.0002^*$ ), but not "emotional wellbeing" ( $t=1.95$ ,  $p=0.0524$ ), nor "work stress" ( $t=0.019$ ,  $p=0.8499$ ), or "household stress" ( $t=0.03$ ,  $p=0.9743$ ).

### Discussion

Findings reveal that doctors may have a strong, positive influence on patients' desire to quit smoking. Indeed, in this study, patient education on the health risks of smoking resulted in a significant decrease in the number of cigarettes patients smoked per day after diagnosis with CHD, indicating that patients moved from a pre-contemplative to an action stage of change [15]. To transform these temporary actions into permanent healthy lifestyle behaviors, doctors may use Motivational Interviewing (MI), which is an evidence-based

counseling approach that helps patients follow treatment recommendations. Over the years, research has consistently shown that short MI (less than 20 minutes per session) can be more effective in helping patients realize the health risks and the benefits of quitting than a confrontational approach [16]. In addition, compared to brief advice or usual care, MI is more likely to result in permanent abstinence of harmful behaviors [16]. Thus, patient education and motivational interviewing are strategic tools that doctors in Hungary may use to help reduce smoking in patients who have received a diagnosis of CHD.

Patients' self-confidence and motivation to quit cigarette smoking can be enhanced by the whole healthcare providing team. Specialty-trained "care manager" nurses can become an integral part of this team. In collaboration with the doctors and specialists, care managers can facilitate increase in patients' health knowledge, self-management skills, and readiness to make changes in such health behaviors as smoking [17]. Care managers also help patients and their doctors overcome physical and situational barriers by providing home visits to the patients [17]. Reducing patients' obstacles to tobacco cessation can increase the likelihood of patients' maintenance of abstinence from smoking.

In addition to the strong, positive influence of healthcare providers on patients' decisions to pursue a healthier lifestyle, this study also demonstrated that social support plays a key role in the desire to quit smoking. This finding may be especially relevant in Hungary, where smoking is an integral part of the culture [18], and smoking cessation may entail the loss of a peer group. Thus, in order to help patients withstand being the nonsmoking minority in a social group, doctors may encourage the use of cognitive behavioral therapy techniques, which promote the adoption of helpful patterns of thinking and positive responses to people and events. In addition, doctors may refer patients to group counseling and support groups to enhance their confidence and resources for peer support as they attempt to quit smoking. Finally, at a national level, doctors may collaborate with public health researchers and policymakers to reduce the social acceptance of smoking and make it easier for patients in Hungary to quit. For example, anti-smoking social messages can be disseminated through a variety of media, including TV, radio, magazines, newspapers, and ads in public venues. These messages may be aversive (e.g., "we smoked together, and now we all got cancer and tracheostomies") or encouraging (e.g., "you're not alone; we want to help you") to enhance the likelihood that smokers may quit. In this way, the social acceptability of smoking may be reduced and social support may be increased for patients with CHD who would like to quit smoking.

### Implications for Future Research

Future research in this area should focus on the development and implementation of national anti-smoking policies and interventions in Hungary. For example, researchers may evaluate the effects of recent clean air laws and anti-smoking rules in public areas on rates of smoking [19]. Researchers may also support the development of employee smoking cessation programs, smoke-free work zones, increased insurance premiums for smokers, taxes on cigarettes, and limitations on tobacco distribution [19]. Ultimately, these changes in public policies may transform the public's perspective on smoking and reduce rates of tobacco use among Hungarian adults, especially those who have received a diagnosis of CHD.

## Study Limitations

The current study may have the following limitations: first, because it used a cross sectional design as well as self-reported data, it is possible that participants may have misreported vital information, such as their smoking status, on the questionnaire; second, this study used convenience sampling and included chronically ill patients at one hospital, which limits the generalizability of the findings.

## Recommendations

The study illustrates the need to develop more effective smoking cessation intervention programs for CHD patients, who are at high risk for mortality as a result of their disease. In other words, implementations of systematic strategies that institutionalize cessation-counseling services are needed; these may include training of health care providers to deliver effective cessation programs, including pharmacological treatment for tobacco dependency. Hungary may also benefit from evidence-based interventions that are used in countries with more advanced tobacco control policies and anti-smoking campaigns such as those used by the Centers for Disease Control.

## Contributions

Judit Bakai conducted recruitment and survey of participants. Linda Haddad and Roula Ghadban analyzed the data and synthesized the manuscript. Anastasiya Ferrell reviewed and edited the manuscript.

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