

Registration and management of smoking behaviour in patients with coronary heart disease

The EUROASPIRE survey

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Aims To establish to what extent smoking status and its management is recorded in coronary patients' medical records, and to investigate their motivation to change smoking behaviour.

Methods In EUROASPIRE, a survey on secondary prevention in 21 hospitals in the Czech Republic, Finland, France, Germany, Hungary, Italy, the Netherlands, Slovenia and Spain, data were collected from records of 4863 consecutive patients ≤ 70 years of age, with previous (>6 months) admission for coronary bypass operation, angioplasty, myocardial infarction or ischaemia. Of these, 3569 patients were interviewed 1.6 years following their index hospitalization.

Results Of the 82% of patients whose pre-hospitalization smoking behaviour was known, 34% were smokers. Documentation was significantly better in younger patients, in males and patients requiring angioplasty or bypass operation. In only 35% of 1364 smokers was the smoking habit recorded again after discharge from hospital. At the time of the interview, 554 of the interviewed patients were still smoking. In over 90% of the smokers, advice to quit smoking was reported at interview. A positive relationship

was found between receiving advice and seeking help to stop smoking, between receiving advice to stop smoking and attempting to stop, as well as between seeking help and attempting to stop.

Conclusion In almost 20% of coronary patients, smoking habits are not documented in medical records, and in only 35% of the smoking patients is smoking status documented at the follow-up. After a cardiac event requiring hospitalization as many as 50% of patients continue their smoking habit and so there is further potential to reduce the risk of recurrent coronary disease. Advice to stop smoking motivates patients to seek help and to attempt to stop smoking. Physicians repeated advice to stop smoking is important and smoking status should always be documented at follow-up.

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Key Words: Coronary heart disease, secondary prevention, smoking, registration.

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Introduction

In recent decades, a large number of epidemiological studies have demonstrated a relationship between cigarette smoking and the occurrence of cardiovascular diseases^[1,2]. A high incidence of cardiovascular disease is reported in smokers compared to non-smokers, and hence a higher rate of cardiovascular deaths in smokers.

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In the extensive British doctors study, the observed cardiac mortality in a 40-year follow-up among smokers under 65 was more than twice that of non-smokers^[3]. Therefore, the effect of smoking cessation was also investigated. In a study of 2336 healthy smoking young men, the rate of myocardial infarction among those who stopped smoking at some time during 18 years of follow-up was only half the rate of those who continued^[4].

The favourable effect of smoking cessation on the prognosis of patients with established coronary artery disease, especially after myocardial infarction^[5], but also coronary bypass operation^[6], has been well established.

Stopping smoking after a coronary event significantly diminishes the probability of death and myocardial infarction^[7]; besides this, lower hospitalization rates were observed^[8]. Furthermore, smoking cessation is by far the most effective and cost-effective way to reduce the risk of cardiac complications^[9].

In 1994, the recommendations on prevention of coronary heart disease of the European Society of Cardiology, the European Atherosclerosis Society and the European Society of Hypertension were published^[10]. As part of the strategy to enable the adoption, dissemination and implementation of these recommendations, a European survey on the evaluation of current secondary prevention practice was started (EUROPEAN Action on Secondary Prevention through Intervention to Reduce Events; EUROASPIRE). The primary aim was to determine to what extent major risk factors for coronary heart disease and their management are recorded in the files of coronary patients. A second objective was to describe patients' lifestyle at least 6 months after hospitalization for a coronary event^[11]. In the Guidelines on acute myocardial infarction, smoking cessation is described as potentially the most effective of all secondary prevention measures and therefore much effort should be devoted to this end. Support and advice is needed during rehabilitation and a smoking cessation protocol should be adopted in each hospital^[12]. EUROASPIRE made an inventory of the registration and management of smoking behaviour in coronary patients in several hospitals across Europe and the change in lifestyle after hospitalization for a coronary event.

Methods

The EUROASPIRE survey

Between May 1995 and April 1996, 21 selected hospitals from nine regions in the Czech Republic, Finland, France, Germany, Hungary, Italy, the Netherlands, Slovenia and Spain participated in this survey. 4863 consecutive patients (≤ 70 year) were enrolled following hospitalization for either a first coronary bypass operation, a first angioplasty, a first myocardial infarction or an episode of acute myocardial ischaemia: the so-called index event. Demographic data, information about risk factors, treatment and prescribed medication were collected from the medical records over the period before, as well as after, the index event. 3569 patients were interviewed (73% response), on average 1.6 years after the event. Information was obtained about lifestyle, and about advice received concerning the coronary risk factors; besides this, measurements of blood pressure, height and weight, cholesterol, glucose and carbon monoxide were performed. A detailed description of the EUROASPIRE survey has been published^[11].

Present study

The present study is based on data from the EUROASPIRE survey. Data collected from medical

records were used to describe the cardiologists' policy with regard to registration, and management of patients' smoking behaviour. Data from the interview were used to describe patients' smoking behaviour after the index event, as well as actions taken to change to a healthier lifestyle. Self-reported smoking habits were compared with the measured expired carbon monoxide, with the threshold set at 10 particles per millilitre. Other coronary risk factors were also evaluated. Patients were categorized according to their smoking status at the time of the hospitalization and at the interview. Current smokers are those who were smoking at the time of recording or interview, respectively. Non-smokers were divided into ex-smokers (those who had smoked sometime before the recording or interview) and never smokers.

Statistics

Univariate comparisons of differences in baseline and outcome variables between the groups were done by a Chi-square analysis for categorical variables and a Kruskal-Wallis test for ordinal variables. Multivariate analyses of the effects of all demographic variables were done by multiple logistic analysis. Differences were considered statistically significant if the *P*-value was less than 0.05.

Results

Quality of documentation of smoking behaviour

Pre-event

Smoking status (current smoking or non-smoking) was documented before the index event in 3967 (82%) of all 4863 patients (Fig. 1). Pre-event smoking documentation was significantly more frequent ($P < 0.001$) in younger patients (< 50 years: 85%; 50–60 years: 84% and 60–70 years: 79%) (Table 1). In addition, smoking documentation was commoner in males (85% vs females 73%) and in those enrolled for bypass surgery or angioplasty (87% and 84%, respectively, vs 78% for both myocardial infarction and ischaemia). 1364 (34%) patients, of those whose pre-hospitalization smoking status was recorded, were smokers and 2603 (66%) non-smokers. In 442 (17%) of the recorded non-smokers, no past history of smoking (ex-smoking or never smoking) was recorded. Prevalence of other coronary risk factors was less frequently recorded in medical records than smoking behaviour: hypertension in 78% of the cases, diabetes in 75%, hyperlipidaemia in 59%, and family history of coronary heart disease in 69%. In records without smoking status information, all coronary risk factors were entered significantly less frequently than in records in which smoking status was recorded.

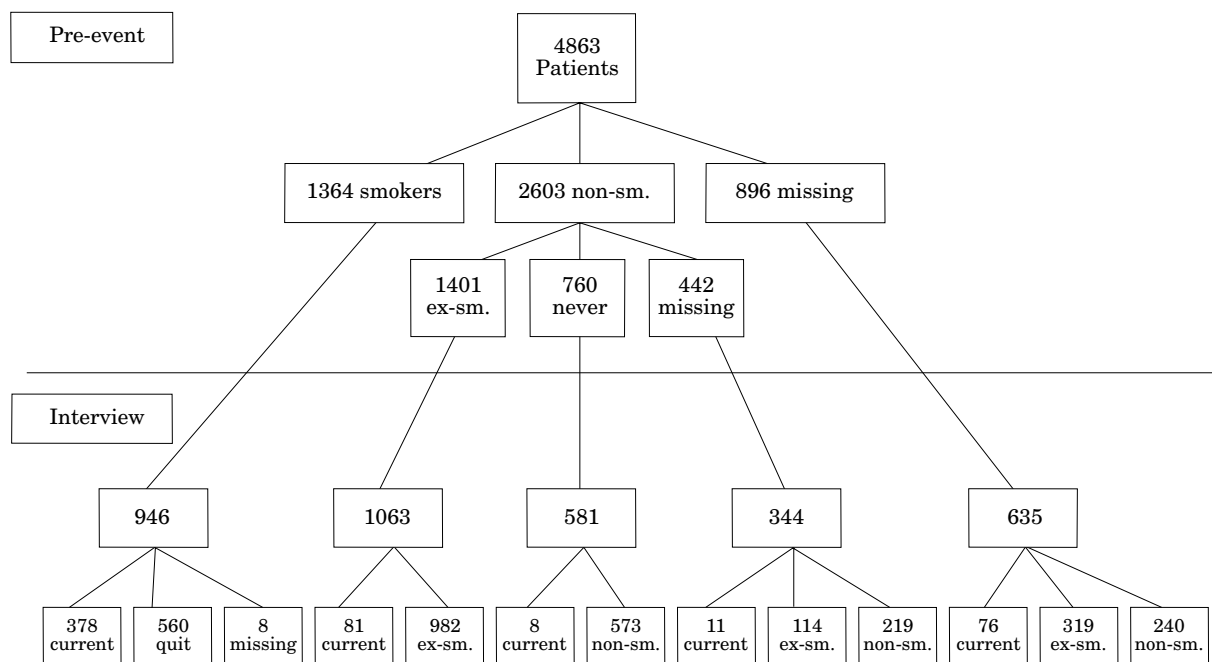


Figure 1 Overview of all 4863 participating patients.

Post-event

Smoking behaviour after the event, in pre-event smokers, was documented in 472 (35%) patients, on average 1.2 years (median 1.0 year, interquartile 0.7–1.6) after the index event. Almost half of the patients (221) were still smoking. In 57% of the post-event smokers, some action by the cardiologist, to change patients' behaviour, was recorded. In 48%, simple verbal advice was given to stop smoking, in 9% some form of counselling was encouraged.

Smoking behaviour as assessed during the interview

Current smokers

At the time of the interview, on an average 1.6 years post-event, 554 (16%) of the 3569 interviewed patients were self-reported current smokers (Table 2). 1294 patients (of whom 281 had died) did not attend the interview. Compared to patients who did attend the interview, those who were not interviewed were more likely to be women ($P < 0.05$), more likely to belong to the acute ischaemia and myocardial infarction group, less often had a history of coronary artery disease and were more often pre-event smokers ($P < 0.001$). There was good agreement (κ -value 0.7) between self-reported smoking habits and breath carbon monoxide measurements. In fewer than 5% of the patients who said they were not smoking, the breath carbon monoxide value exceeded 10 particles per millilitre. Of the 946 pre-event smokers, 378 (40%) were still smoking at the time of the interview (Table 3). In eight patients, information about smoking status was missing. The pre-event smoking

status was not recorded in 76 out of the remaining 176 interviewed smoking patients, while 100 patients were recorded as being non-smokers. A large majority (512) of the 554 smoking patients at the time of the interview smoked cigarettes. The average number of cigarettes smoked per day was 10 (interquartile range 5–20). In a multivariate analysis, patients who underwent angioplasty or were admitted for acute ischaemia, and those with a history of coronary artery disease were least likely to stop smoking. Smoking cessation figures differed widely between countries (Table 3). In patients who persisted in smoking, advice to stop smoking was recorded more frequently, mainly before the index event. More than 80% of the persistent smokers had made an attempt to stop smoking: one third tried reduction and 20% used additional help such as nicotine substitution. In the patients who stopped smoking, almost 90% totally abstained from smoking immediately.

Of the total of 554 patients who were smoking at the time of the interview, 512 patients reported that they had received advice to stop smoking (92%). In 64% of the patients — mainly those who underwent an intervention — the advice was given before the index event, and in only 31% patient — mainly those who had an acute ischaemic syndrome — during hospitalization. The advice was given to 70% of the patients by the hospital doctor, and by the general practitioner to 50%. No significant differences in characteristics were found in patients who received advice to stop smoking and those who did not. 114 patients (21%) had sought help to stop smoking, mostly before the event (69%). Help was asked mainly from the hospital doctor and the general practitioner (30% and 47%, respectively). A positive relationship was found between

Table 1 Pre-event recording of smoking status and smoking behaviour within different categories

Category	n	Recorded smoking status	Smoking	Non-smoking		
				Ex	Never	?
All	4863	n=3967 (82%)	n=1364 (34%)	n=1401 (54%)	n=760 (29%)	n=44 (17%)
Age		*	†	*		
<50 years	1007	85%	55%	28%	10%	7%
50–60 years	1563	84%	36%	34%	20%	10%
>60 years	2293	79%	23%	40%	23%	14%
Gender		†	†	†		
Male	3662	85%	38%	41%	13%	8%
Female	1201	73%	23%	17%	39%	21%
Country		†	†	†		
Czech Republic	526	85%	33%	40%	20%	6%
Finland	531	84%	21%	39%	31%	9%
France	546	84%	42%	36%	18%	4%
Germany	524	84%	37%	30%	27%	6%
Hungary	546	66%	43%	20%	22%	15%
Italy	619	92%	32%	38%	28%	2%
The Netherlands	535	68%	41%	24%	4%	31%
Slovenia	526	74%	29%	37%	20%	14%
Spain	510	97%	33%	46%	0%	20%
Index event		†	†	†		
CABG	1179	87%	24%	46%	19%	12%
PTCA	1156	84%	30%	43%	17%	10%
AMI	1387	78%	50%	24%	18%	8%
Ischaemia	1141	78%	33%	28%	23%	16%
History of CAD			†	†		
No	1547	81%	51%	22%	19%	8%
Yes	3286	82%	27%	42%	19%	12%

* $P<0.005$; † $P<0.001$ (univariate Chi-square test).

receiving advice and seeking help to stop smoking ($P<0.001$).

457 patients (83%) had attempted to stop smoking in the past: 45% of these tried to abstain, 35% tried to reduce and 16% used nicotine substitution. A positive relationship was found between receiving advice, seeking help ($P<0.001$), and attempting to stop smoking ($P<0.001$).

Current non-smokers

Of the 3015 patients who stated at the interview they were non-smokers, 2056 (68%) had been smokers at some time before the interview; thus, 2610 (73%) of the interviewed patients had a positive smoking history. Patients, who had smoked in the past, had the same characteristics as current smokers. The median length of time since they had stopped smoking was 48 months (interquartile range 21–180).

The other major coronary risk factors (hypertension, diabetes and family history of coronary artery disease) had a higher prevalence in never smokers than in smokers, but hyperlipidaemia, known to be adversely affected by smoking, was mostly seen in smokers (Table 4). Ex-smokers had an intermediate prevalence of risk factors.

Discussion

Registration of smoking status, as assessed in this survey, is far from optimal. For 896 patients (18%), no entry could be found in the medical record, on smoking behaviour at any time before the index event; in 442 of the non-smokers (17%), no information on history of smoking was recorded. According to the recommendations on prevention of coronary heart disease of the European Society of Cardiology^[13] and the Guidelines on acute myocardial infarction^[12], much effort should be devoted to smoking cessation. Support and advice is needed during rehabilitation and a smoking cessation protocol should be adopted in every hospital. To assess a patient's risk, information about current smoking and a history of smoking should be entered in every medical record. In addition, to evaluate future risk factors, recording of past smoking is important, in case of a relapse. Even so, the percentage of registration of smoking is higher than any other monitored coronary risk factors. Registrations of risk factors in other studies were similar: 89% in 258 medical records of patients who underwent a bypass operation and 90% in 112 patients admitted for acute chest pain syndromes^[14,15]. In both

Table 2 Characteristics of the patients who did attend the interview according to smoking behaviour at interview

	Interviewed	Smoking	Non-smoking	
			Ex	Never
All	3569 (73% of 4863)	n=554 (16%)	n=2056 (68%)	n=959 (32%)
Age		†	†	
<50 years	73%	27%	58%	14%
50–60 years	75%	17%	57%	26%
≥60 years	72%	9%	58%	33%
Gender	§	†	†	
Male	74%	17%	66%	17%
Female	71%	10%	32%	58%
Country	†	†	†	
Czech Republic	63%	12%	57%	31%
Finland	78%	12%	49%	39%
France	73%	19%	56%	25%
Germany	75%	13%	64%	23%
Hungary	77%	20%	52%	28%
Italy	69%	17%	60%	23%
The Netherlands	72%	29%	57%	14%
Slovenia	76%	9%	57%	34%
Spain	76%	9%	67%	24%
Index event	†	†	†	
CABG	77%	10%	65%	25%
PTCA	78%	17%	59%	24%
AMI	67%	16%	61%	23%
Ischaemia	72%	19%	44%	36%
History of CAD	†	‡		
No	70%	18%	58%	24%
Yes	75%	15%	58%	27%

§ $P<0.05$; ‡ $P<0.01$; * $P<0.005$; † $P<0.001$ (univariate Chi-square test).

studies, registration of smoking had the highest prevalence of all coronary risk factors. The actual attention paid to smoking behaviour may have been even higher, because the topic, although raised during the consultation, may not have been recorded. This is to be expected, in non-smokers in particular. This assumption is confirmed by the number of ex-smokers at the interview. This exceeds the number of pre-event ex-smokers plus the quitters at interview. About 155 of the 442 non-smokers, whose pre-event smoking history was unknown, were ex-smokers so the majority had never smoked. Those undergoing coronary intervention were more frequently asked about their smoking behaviour than those admitted for acute ischaemia or myocardial infarction, while those who underwent an acute ischaemic syndrome smoked more. Presumably, patients with the highest risk of coronary complications and the highest expected gain from smoking cessation are more likely to be asked about their smoking habits; they may also have had longer medical contact. Post-event registration of smoking status was present in only 35% of all pre-event smokers. Consequently, in 65% of smokers the unhealthy behaviour has been ignored. It is most probable that these patients have not changed, and therefore this 'no change' is not recorded, which means that the

patient is still smoking. It is also possible that the subject of smoking has not been raised again.

Smoking behaviour

Of all patients whose smoking status was known from the records or interview, 3293 had smoked at some time. At the time of the interview, 560 (59%) of the 946 pre-event smokers had stopped smoking, which is very encouraging. Apparently, a coronary event together with the knowledge of the risk of smoking encourages over 50% of patients to give up smoking, which is in agreement with other reported data^[5,7]. Since these patients less often received advice to stop smoking and looked for help, they were probably very determined to stop. Therefore, time and effort should be targeted at the 41% less motivated patients, who need more attention and support to stop smoking. Furthermore, relapse should always be taken into account and therefore continuing to document smoking status at follow-up is important.

As far as advice for smoking cessation is concerned, some action was recorded in 57% of the smoking patients. It is likely that more patients received advice to

Table 3 Differences in characteristics between pre-event smokers who stopped smoking after the index event and those who persisted to smoke

	Persisted (n=378)	Stopped (n=560)	P-value	
			Univariate	Multivariate
Age			0.13	0.15
<50 years	44%	56%		
50–60 years	41%	59%		
>60 years	36%	64%		
Gender			0.55	0.02
Male	41%	59%		
Female	38%	62%		
Country			<0.001	<0.001
Czech Republic	34%	66%		
Finland	54%	46%		
France	39%	61%		
Germany	30%	70%		
Hungary	51%	49%		
Italy	45%	55%		
The Netherlands	62%	38%		
Slovenia	29%	71%		
Spain	22%	78%		
Index event			<0.001	<0.001
CABG	37%	63%		
PTCA	43%	57%		
AMI	31%	69%		
Ischaemia	57%	43%		
History of CAD			<0.001	<0.001
No	34%	66%		
Yes	46%	54%		
	n=378	n=560	Univariate	
Advice offered			<0.001	
No	18%	82%		
Yes	44%	56%		
When offered			<0.001	
Before event	49%	51%		
In hospital	35%	65%		
After event	61%	39%		
Help sought			<0.001	
No	37%	63%		
Yes	59%	41%		
Attempt to stop			<0.001	
No	90%	10%		
Yes	36%	64%		
How			<0.001	
Abstinence	23%	77%		
Reduction	78%	22%		
Nicotine substitution	68%	32%		
Other	56%	44%		

stop smoking, but the cardiologist did not consider it necessary to record this in the patient's notes. The result at interview, that 92% of the current smokers had received advice to stop smoking, confirms this. According to the recommendations of the Task Force on prevention in coronary heart disease, a physician's firm advice to stop smoking is of crucial importance to start the smoking cessation process, particularly at the

time of diagnosis of coronary artery disease. Referral to a specialized smoking cessation intervention programme is very low (9%). Since offering help to stop smoking is time-consuming, referral to a special cessation programme offered by, for example, a nurse or health counsellor, could be efficient^[16], but it is still very important for the cardiologist to give repeated advice about the importance of stopping smoking.

Table 4 Prevalence of other coronary risk factors in interviewed patients (%)

	All patients (n=3569)	Smoker (n=554)	Ex-smoker (n=2056)	Never smoker (n=959)
Hypertension*	1892 (53%)	49	51	59
Hyperlipidaemia†	1212 (34%)	50	42	45
Obesity‡	900 (25%)	24	25	26
Diabetes	641 (18%)	14	18	21
Family history of CAD	1812 (51%)	50	51	56

*(SBP \geq 140 mmHg or DBP \geq 90 mmHg).

†Total cholesterol \geq 5.5 mmol . l⁻¹.

‡BMI \geq 30 kg . m⁻².

1st Visit:

Ask for smoking status:

- never smoked → no action
- stopped smoking → ask when stopped→ follow-up (relapse)
- currently smoking → - give information
 - check motivation
 - give advice to stop +
 consider additional support:
 - nicotine substitution
 - referral to counselling
 - follow-up

Follow-up:

Ask again for smoking status:

- ex-smokers → check for possible relapse
- recent smokers
 - stopped → cave relapse
 - still smoking → - re-encourage to stop
 - give advice to stop +
 additional support:
 - nicotine substitution
 - referral to counselling

Figure 2 Recommendations for actions to be taken for smoking patients.

There were striking differences among the various countries in terms of pre-event recording of smoking behaviour, with Spain (97%) and Hungary (66%) at the extremes. Since only between one to three hospitals were included per country, differences between the various countries should be carefully interpreted. Differences may be attributed to different policies in the various hospitals, rather than countries. Dissimilarities between hospitals in these countries could be ascribed to differ-

ences in professional behaviour, professional society or national guidelines, government policy and cultural and economic differences.

Study limitations

Since only a few hospitals per country were included, conclusions could not be extrapolated to the countries as

a whole. Of the 4863 patients included, 3569 attended the interview. As shown in the results, patients not attending the interview had different characteristics. They were more likely to be female, to have been hospitalized for an acute myocardial infarction or ischaemia, and to have no past history of coronary heart disease. More pre-event smokers did not attend the interview. Patients were enrolled at least 6 months after the index event. Pre-event information obtained from the medical record is more reliable in patients who underwent an intervention, since in patients admitted with myocardial infarction or an acute ischaemic episode, less pre-event information will be available. Results concerning the attempt to stop were not dated, so no relationship to the coronary event can be given.

Conclusions and perspective

An attentive attitude by the cardiologist with regard to smoking behaviour and intensive support to quit smoking is recommended (Fig. 2). Although records in the medical notes were good, improvement is still desirable, particularly in relation to post-event recording of smoking habits. The importance of raising the subject of smoking should be reflected in the need to record this information. Patients who are known to be smoking should be followed and repeatedly reminded and motivated, otherwise, they could mistakenly draw the conclusion that the need to change behaviour is no longer recommended. Attempts to quit smoking immediately are more likely to succeed than a gradual decrease in the number of cigarettes, thus patients should be encouraged to stop completely. In 3–5% of patients, insistent motivation by the specialist or general practitioner can help the patients to change their lifestyle^[17]. Smoking intervention programmes, in addition to physician advice, can improve these results with 70% quitting smoking as a result of an intervention group vs 53% in a normal care group^[18] and 62% quitting smoking in an intervention group vs 51% in a cessation advice only group^[19]. Although, for some patients, the physician's advice to stop smoking is in itself sufficiently effective, more support should be offered to other patients. Smoking cessation interventions conducted by, for example, a nurse offer an effective and cost-effective tool for coronary patients during hospitalization as well as for ambulatory patients.

Appendix

The EUROASPIRE Study Group comprises the following Principal Investigators: J. Simon (Czech Republic), K. Pyörälä (Finland), P. Amouyel (France), U. Keil (Germany), E. Östör (Hungary), G. B. Ambrosio (Italy), J. W. Deckers (The Netherlands), J. Turk (Slovenia), S. Sans (Spain).

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