Time Trends in Lifestyle, Risk Factor Control, and Use of Evidence-Based Medications in Patients With Coronary Heart Disease in Europe

Results From 3 EUROASPIRE Surveys, 1999—2013

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Background: The EUROASPIRE (European Action on Secondary and Primary Prevention by Intervention to Reduce Events) cross-sectional surveys describe time trends in lifestyle and risk factor control among coronary patients between 1999 and 2013 in Belgium, Czech Republic, Finland, France, Ireland, the Netherlands, Poland, Slovenia, and the United Kingdom as part of the EuroObservational Research Programme under the auspices of European Society of Cardiology.

Objectives: This study sought to describe time trends in lifestyle, risk factor control, and the use of evidence-based medication in coronary patients across Europe.

Methods: The EUROASPIRE II (1999 to 2000), III (2006 to 2007), and IV (2012 to 13) surveys were conducted in the same geographical areas and selected hospitals in each country. Consecutive patients ($\leq$70 years) after coronary artery bypass graft, percutaneous coronary intervention, or an acute coronary syndrome identified from hospital records were interviewed and examined $\geq$6 months later with standardized methods.

Results: Of 12,775 identified coronary patients, 8,456 (66.2%) were interviewed. Proportion of current smokers was similar across the 3 surveys. Prevalence of obesity increased by 7%. The prevalence of raised blood pressure ($\geq$140/90 mm Hg or $\geq$140/80 mm Hg with diabetes) dropped by 8% from EUROASPIRE III to IV, and therapeutic control of blood pressure improved with 55% of patients below target in IV. The prevalence of low-density lipoprotein cholesterol $\geq$2.5 mmol/l decreased by 44%. In EUROASPIRE IV, 75% were above the target low-density lipoprotein cholesterol <1.8 mmol/l. The prevalence of self-reported diabetes increased by 9%. The use of evidence-based medications increased between the EUROASPIRE II and III surveys, but did not change between the III and IV surveys.

Conclusions: Lifestyle habits have deteriorated over time with increases in obesity, central obesity, and diabetes and stagnating rates of persistent smoking. Although blood pressure and lipid management improved, they are still not optimally controlled and the use of evidence-based medications appears to have stalled apart from the increased use of high-intensity statins. These results underline the importance of offering coronary patients access to modern preventive cardiology programs.

In 2012, the 194 World Health Organization member states adopted a global target to reduce premature mortality from noncommunicable diseases by 25% by 2025 [1]. Cardiovascular disease (CVD) accounts for a majority of noncommunicable disease mortality and is preventable. The World Health Organization adopted targets to achieve this ambition embracing lifestyle, risk factors, and the use of essential medicines and technologies, including preventive and rehabilitative care for those with established CVD. Since 1996, the EUROASPIRE (European Action on Secondary and Primary Prevention by Intervention to Reduce Events) surveys have described the management of coronary patients using comparable methodologies over time [2—8]. The same 9 countries participated in EUROASPIRE II (1999 to 2000) [3], EUROASPIRE III (2007 to 2008) [5], and EUROASPIRE IV (2012 to 2013) [7,8]. These 3 surveys

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included a total of 12,775 consecutive patients with established coronary artery disease of whom 8,456 were interviewed at least 6 months after their initial hospitalization and form the basis for 14-year time trend analyses in lifestyle and therapeutic management compared with targets set by the most recent Joint European Societies Cardiovascular Prevention Guidelines in Clinical Practice [9]. The comparison among the EUROASPIRE I, II, and III surveys showed an increase in obesity, no change in smoking, and poor blood pressure and lipids control despite the substantial increase in blood pressure and lipid-lowering drugs. In EUROASPIRE IV, we looked at the lifestyle and medical risk factors and the use of evidence-based medication as it was important to determine whether the adverse lifestyle and risk factors time trends continued and whether the practice of preventive cardiology has improved by comparison with the previous surveys.

METHODS

Study design

EUROASPIRE II, III, and IV were cross-sectional surveys conducted from 1999 to 2013 in Belgium, the Czech Republic, Finland, France, Ireland, the Netherlands, Poland, Slovenia, and the United Kingdom. The surveys were undertaken in the same geographical areas including at least 1 hospital offering interventional cardiology and cardiac surgery, and 1 or more acute hospitals receiving patients with acute myocardial infarction and unstable angina. A sample of hospitals was taken in such a way that any patient presenting within the geographical area with acute symptoms of coronary disease, or requiring revascularization in the form of balloon angioplasty or coronary artery surgery, had an approximately equal chance of being included in the patient sample. Countries where the surveys were undertaken in different areas were excluded. The number of centers in the 3 surveys was 26, 27, and 32, respectively, from the same geographical areas.

Study population

Consecutive patients, men or women (≥18 years and <70 years at the time of identification), with first or recurrent clinical diagnosis for coronary heart disease were retrospectively identified from diagnostic registers, hospital discharge lists or other sources: coronary artery bypass grafting; percutaneous coronary intervention; acute myocardial infarction; and unstable angina. The starting date for identification was >6 months and ≤3 years prior to the study interview.

Data collection

Information on personal and demographic details, self-reported lifestyle, and medication was obtained at the interviews. Central training of data collectors ensured quality of data collection according to a written protocol, using standardized methodologies for all measurements, equipment calibrated according to the manufacturer's recommendations, and a central laboratory for total and high-density lipoprotein cholesterol and triglycerides (see the Online Appendix). The low-density lipoprotein cholesterol (LDL-C) concentration was calculated using the Friedewald formula in all surveys [10].

Statistical analyses

A total of 2,100 interviewed patients were required from each of the 3 EUROASPIRE surveys to demonstrate differences in prevalence of at least 5% between surveys with 90% power at the 0.05 significance level. Frequency of risk factors, lifestyles, and drug use by survey, country, sex, and age at interview are therefore reported at a European level only using descriptive statistics. Clustering of patients within centers was taken into account using multilevel modeling. A random coefficient model allowed for variation in time trends of risk factor frequencies between countries. The p values for evaluating the null hypothesis of equality in risk factor frequencies between surveys were based on Wald-type tests. Tukey method for correcting p values and confidence intervals was used to account for multiplicity in pairwise comparisons of surveys. Potential confounding due to differences in distributions of age and sex between surveys was adjusted for in all models. All statistical analyses were done with SAS statistical software (version 9.3, SAS Institute, Cary, NC).

TABLE 1. Distribution of study population by survey, sex, and age

	EUROASPIRE II	EUROASPIRE III	EUROASPIRE IV
Sex			
Men	75.6 (2,510/3,320)	78.4 (2,064/2,632)	78.0 (1,961/2,513)
Women	24.4 (810/3,320)	21.6 (568/2,632)	22.0 (552/2,513)
Age at interview			
<60 yrs	48.6 (1,614/3,320)	45.4 (1,195/2,632)	39.0 (980/2,513)
≥60 yrs	51.4 (1,706/3,320)	54.6 (1,437/2,632)	61.0 (1,533/2,513)
Age, yrs	59.4 ± 8.4	60.2 ± 7.8	60.2 ± 7.8

Values are % (n/N) or mean ± SD.
EUROASPIRE, European Action on Secondary and Primary Prevention by Intervention to Reduce Events.

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