PREVALENCE OF SELF-REPORTED MYOCARDIAL INFARCTION IN A GREEK SAMPLE: FINDINGS FROM A POPULATION-BASED STUDY IN AN URBAN AREA (MEDICAL EXPRESS 2002)

Gikas A.[1], Sotiropoulos A.[2], Panagiotakos D.B.[3], Pappas S.[2]
[1]Health Centre of Salamis, Salamis
[2]Third Department of Internal Medicine, "Saint Panteleimon" General Hospital, Nikea
[3]Hellenic Heart Foundation, Athens, Greece

SUMMARY

During the 1970s and 1980s, Greece was known as a country with low prevalence and incidence of coronary heart disease, compared to Western populations. However, during the past decades, the Greek population has experienced marked but uneven socio-economic development, as well as change in lifestyle habits. We assessed the prevalence of self-reported myocardial infarction (MI) in a sample of the general population, aged 20–94 years. The overall prevalence of self-reported MI was 4.1% (6.3% in men and 1.9% in women). The age-adjusted prevalence was found to be 3.6%, showing a threefold increase compared to 1980s.

Age, gender (male), low educational level, obesity/overweight, hypercholesterolemia, diabetes, hypertension, smoking and origin were strongly associated with prevalence of MI. Our findings indicate that the prevalence of MI increased dramatically during the past years, reflecting the change in lifestyle habits that have gradually given way to "Western"-type diets and a more sedentary lifestyle. Therefore, the need for urgent intervention is considered essential in order to prevent a further increase of disease burden.

Key words: myocardial infarction, coronary heart disease, cardiovascular risk factors, urban population

Address for correspondence: A. Gikas, 6, Gavriilidou Street, 11141, Ano Patisia, Athens, Greece. E-mail: argikas@internet.gr

INTRODUCTION

Coronary heart disease (CHD) is a leading cause of morbidity and mortality. Understanding trends in CHD prevalence is important, since it provides information about the burden of disease, which is the first step before population-based interventions are undertaken. During the 1970s and 1980s, Greece was known for low incidence of CHD compared to Western populations, mainly due to the different lifestyle related behaviors (1). However, during the past decades, the Greek population has experienced marked but uneven socio-economic development (2). Although the education status has improved, the lifestyle of people has worsened; age-old dietary habits and high habitual physical activity have gradually given way to "Western"-type diets and a more sedentary lifestyle, accompanied by increased smoking habits (2, 3). Since very few studies have addressed the prevalence of CHD in the Greek population, in the last 30 years (4, 5), we therefore sought to investigate the prevalence of self-reported myocardial infarction (MI), in relation to the conventional risk factors in the urban Greek population.

STUDY POPULATION AND METHODS

The survey was carried out in the island of Salamis located to the greater Athens area, which has a total population of approximately 3.7 million. The sample of the study consisted of 2,805 residents (1,375 men and 1,430 women), aged 20–94 years. This sample constituted to 12.4% of the target population, namely 22,627 adult residents of the Municipality of Salamis, and was representative regarding age and sex, based on the recent census of 2001.

The data were collected during an interview process on an election day (2002). Ten specifically trained health professional interviewers performed face-to-face interviews, using a standardized questionnaire. The overall response rate of eligible participants was 91%. Respondents younger than 20 years old were excluded from the study.

All participants were asked if they ever had medical diagnosis of MI. The year of the heart attack occurrence was also recorded. In addition, data concerning demographic and anthropometric characteristics, presence of diabetes, high blood pressure, hypercholesterolemia and smoking status were also collected. The distribution of these characteristics in the study population is demonstrated in Table 1.

Respondents were classified as having hypercholesterolemia if: first, a doctor had told them that cholesterol was high and second, they reported having a blood total cholesterol higher than 240 mg/dl (>6.21 mmol/l) (6) in repeated measures (more than one). They were also asked whether they were taking medicine for high blood cholesterol.

Based on self-reported height and weight, participants were classified as overweight if their BMI was 25.99 kg/m² and as obese if BMI was ≥30 kg/m². A detailed description of the study's design and sampling methods has been previously published (7).

Table 1. *Characteristics of the study population*

Characteristic	n	%
Sex		
Women	1,430	51.0
Men	1,375	49.0
Educational level (years of school)		
Higher (>14)	444	15.8
Moderate (10–14)	889	31.7
Low (<10)	1,472	52.5
Smoking habit		
Non smokers	1,452	51.8
Current smokers	1,037	37.0
Former smokers	316	11.2
Origin from Salamis		
Yes	1,398	49.8
No	1,407	50.2
BMI (kg/m^2)		
<25	1,050	37.4
25–29.9	1,240	44.2
≥30	515	18.4
Hypertension		
No	2,241	79.9
Yes	564	20.1
Diabetes		
No	2,560	91.3
Yes	245	8.7
Hypercholesterolemia		
No	2,315	82.5
Yes	490	17.5

The Pearson's χ^2 test and multiple logistic regression analysis were used for the statistical evaluation. The prevalence of MI was age-adjusted by using the direct method, based on the 2001 standard population of Greece.

RESULTS

The overall prevalence of self-reported MI was 4.1% (6.3% in men and 1.9% in women) (Table 2). When we standardized the previous rates for the age-distribution of the Greek population (2001 census) the prevalence of MI was equal to 3.6% (5.4% in men and 1.9% in women). Rates of MI increased with age. A slight decline was observed in men ≥75 years old, probably due to higher mortality from coronary heart disease above this age. The mean age of MI's first occurrence was 59±10 (range 33–80) years.

As shown in Table 3, results of multivariate analysis revealed that the rates of MI were significantly higher in older people, men, people with low educational level, ever smokers and in those who were not born in Salamis. Also, overweight/obesity, hypertension, diabetes and hypercholesterolemia were associated with higher rates of MI. Hypercholesterolemia, prevailing in 17.5% of the study's population, was shown to be the most prominent factor associated with the prevalence of MI (Odds Ratio = 8.2). Furthermore, the prevalence of hypercholesterolemia was higher in people over 50 years old (27.3% vs 8.5%, p<0.0001). Among those with hypercholesterolemia, 189 individuals (39%) reported that they were under cholesterol-lowering drug therapy.

DISCUSSION

The first epidemiological study on CHD in Greece (represented in 'the Seven Countries Study' by two rural communities), which was carried out in the 1960s, showed that the prevalence of MI was very low (0.3%) in men aged 40–59 years (1). A later study carried out in the 1980s and conducted in a representative adult

Table 2. *Prevalence rates of self-reported myocardial infarction among 2,805 adult residents of Salamis, Greece, based on different age groups in both sexes*

	Men	Women	Total
Age group	% (n)	% (n)	% (n)
20–34	– (0/331)	– (0/379)	– (0/710)
35–44	1.3 (3/228)	– (0/238)	0.6 (3/466)
45–54	2.1 (5/243)	0.9 (2/229)	1.5 (7/472)
55–64	10.8 (27/250)	3.2 (8/252)	7.0 (35/502)
65–74	17.7 (40/226)	4.8 (11/228)	11.2 (51/454)
≥75	12.4 (12/97)	5.8 (6/104)	9.0 (18/201)
Total	6.3 (87/1,375)	1.9 (27/1,430)	4.1 (114/2,805)
95% CI	5.0–7.6	1.2–2.6	3.3–4.8
Age adjusted †	5.4	1.9	3.6
95% CI	5.35–5.45	1.88–1.92	3.56–3.64

CI=Confidence Interval

†Adjusted to the age-distribution of population of Greece, according to 2001 census data

Table 3. *Prevalence rates of self-reported myocardial infarction and effects of potential risk factors in adult population of Salamis, Greece*

	Prevalence %	Unadjusted Odds Ratio (95% CI)	P	Adjusted Odds Ratio (95% CI)	P
Age (per year)		1.07 (1.06–1.09)	0.000	1.05 (1.03–1.07)	0.000
Sex					
Women †	1.9***	1.00		1.00	
Men	6.3	3.51 (2.26–5.44)	0.000	5.25 (3.01–9.17)	0.001
Educational level					
Higher †	1.6***	1.00		1.00	
Moderate	1.3	0.85 (0.33–2.18)	0.74	0.93 (0.32–2.67)	0.89
Low	6.5	4.31 (1.98–9.35)	0.000	2.77 (1.12–6.82)	0.027
Smoking habit					
Non smokers †	3.2**	1.00		1.00	
Ever smokers	5.0	1.62 (1.10–2.37)	0.014	2.79 (1.80–4.35)	0.001
Origin from Salamis					
Yes †	3.3*	1.00		1.00	
No	4.8	1.49 (1.02–2.19)	0.040	2.30 (1.47–3.60)	0.001
BMI (kg/m^2)					
<25 †	1.3***	1.00		1.00	
25–29.9	5.1	3.96 (2.21–7.11)	0.000	1.83 (0.99–3.38)	0.055
≥30	7.2	5.73 (3.07–10.7)	0.000	2.29 (1.18–4.44)	0.014
Hypertension					
No †	2.0***	1.00		1.00	
Yes	12.4	7.07 (4.79–10.4)	0.000	2.49 (1.56–3.99)	0.001
Diabetes					
No †	2.5***	1.00		1.00	
Yes	20.0	9.59 (6.44–14.3)	0.000	4.03 (2.54–6.38)	0.001
Hypercholesterolemia					
No †	1.4***	1.00		1.00	
Yes	16.5	13.7 (9.01–20.8)	0.000	8.19 (5.11–13.1)	0.001

CI=Confidence Interval. Ever smokers = current + former smokers

*P=0.039, **P=0.013, ***P<0.0001, based on Pearson's χ^2 test

†Reference group

urban population, showed that the prevalence of MI was 1.08% (4). We found a relatively high prevalence of MI (3.6%), which, compared to the previous study (4), showed a 3.3-fold increase during the last 22 years. A similar increase in the prevalence of MI was observed when we compared our findings with those of the 'Salamis' study (5) conducted in men 30–70 years, in 1978–1980. In that study (5) the prevalence of MI was 2.1% and compared to the 7.0% observed by us (in men of the same age) we could conclude that the prevalence increased 3.3 times in the last 23 years. The observed rise is in line with reported data by Chimonas (8), concerning increased mortality and the number of hospitalised acute MIs, since the 1980s. More particularly, in this paper (8) it was reported that the number of hospitalised patients suffering an acute MI almost doubled during a 15-year period (1980 to 1995).

Compared with recent data from other developed countries, the prevalence of self-reported MI seems to be very close to the USA rates 3.5% (5.1% in men and 2.1% in women) (9), and similar was the prevalence of definite MI in a study from United Kingdom (4.1% in subjects aged over 35 years) (10).

The present survey confirmed that increasing age and male sex are universal major risk factors (11). Out of modifiable risk factors such as hypercholesterolemia, diabetes, hypertension, smoking and overweight/obesity (11–13) it was found that the first two had the greater impact on the prevalence of MI. These findings underscore the role of conventional modifiable risk factors in CHD and, taking into account their continuous increasing incidence in Greek population (3, 7), alarming concerns should be raised about the future extent of the manifestations of arteriosclerosis.

Our findings are in line with other studies showing that CHD is more common in the lower socio-economic class (13, 14). Interestingly, the prevalence of MI was significantly lower in people born and living in the island of Salamis. We could assume that this may be attributed to the differences in dietary factors,

especially fish consumption, which is high among the island's native population (15), and has been associated with lower risk for CHD in previous studies (16).

In conclusion, our findings indicate that the prevalence of MI increased dramatically during the past years, reflecting the change in lifestyle habits that have gradually given way to "Western"--type diets and a more sedentary lifestyle. Therefore, the need for urgent intervention is considered essential in order to prevent a further increase of disease burden.

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