The database of Italian general practitioners allows a reliable determination of the prevalence of myocardial infarction

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Background. **To plan preventive intervention after myocardial infarction (MI) the disease prevalence and the age and time from acute event of the index population should be known.**

Methods. **We identified all the living patients with MI coded diagnosis in the database of the Italian College of General Practitioners (Health Search Database-HSD). The years from the first acute MI were also determined.**

Results. **3588 subjects with MI diagnosis were identified (2698 males and 888 females, for 2 gender not recorded). Based on the distribution of our population and on that reported by the Italian Institute of Statistics, stratified by gender and age (segments of 10 years), the estimated number of subjects with MI in Italy (age-standardized rates × 10 000) was 309 284 for men and 102 343 for women.**

Conclusions. **The prevalence of MI diagnosis in the HSD is very close to that obtained by other epidemiological methods. Querying the database can provide a simple and inexpensive way to estimate and monitor the prevalence of MI in Italy.**

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Introduction

Pharmacological and non-pharmacological secondary prevention for myocardial infarction (MI) is a top health priority. Data about the incidence of MI are usually obtained from hospital or *ad hoc* registries[1,2]. On the contrary, data about prevalence are scarce and are based either upon structured interviews from representative population samples[3,4], upon extrapolation from less representative samples[5], or from lengthy and expensive epidemiological studies[6]. An alternative source of information is represented by the clinical records of general practitioners (GPs). To address this possibility we queried the Health Search Database (HSD) to evaluate the prevalence of MI in Italy.

Methods

From the database contributed by 266 GPs representative of the Italian distribution, updated to April 30, 2002, including overall 420 852 subjects of at least 15 years of age, data has been extracted relevant to patients who have a recorded history of MI (ICD-9 codes 410 and 412, or textual recording of cardiac or MI). We compared our data with available information from the Italian Institute of Statistics (ISTAT) and the Italian Institute of Health.

Results

The demographic characteristics of our sample and of the Italian population[4] are compared in table I.

The extraction identified 3588 subjects complying with the diagnosis of MI (2698 males and 888 females, for 2 gender was not recorded). The prevalence of survivors to MI in our sample and the estimated prevalence in the Italian population are reported in table II.

Based on the distribution of the population seen by the family physicians, and that reported by ISTAT[4], stratified by gender and age (segments of 10 years), the observed prevalent subjects with history of MI generate the estimates of total events and of prevalence (age-standardized rates [ASR] × 10 000) reported in table III.

Table I. Relation of the monitored sample to the overall Italian population.

Age group* (years)	Sample from the database	Italian population	Sample size (% of the population)
Females			
15-24	24 708 (5.9%)	3 332 190 (6.8%)	0.74
25-44	77 624 (18.4%)	8 789 771 (17.8%)	0.88
45-64	59 601 (14.2%)	7 364 720 (14.9%)	0.81
≥ 65	56 178 (13.3%)	6 142 415 (12.4%)	0.91
Total	218 111 (51.8%)	25 629 096 (51.9%)	0.89
Males			
15-24	26 170 (6.2%)	3 482 942 (7.1%)	0.75
25-44	75 544 (18.0%)	8 957 598 (18.1%)	0.84
45-64	58 051 (13.8%)	7 062 488 (14.3%)	0.82
≥ 65	42 976 (10.2%)	4 221 044 (8.6%)	1.02
Total	202 741 (48.2%)	23 724 072 (48.1%)	0.90
Total			
15-24	50 878 (12.1%)	6 815 132 (13.8%)	0.75
25-44	153 168 (36.4%)	17 747 369 (36.0%)	0.86
45-64	117 652 (28.0%)	14 427 208 (29.2%)	0.82
≥ 65	99 154 (23.6%)	10 363 459 (21.0%)	0.96
Total	420 852 (100%)	49 353 168 (100%)	0.89

* the age segment between 0 and 14 years included is not considered since such a population segment does not normally report to the general practitioner but rather to the pediatrician.

Table II. Prevalent myocardial infarction and estimated prevalence in the population.

Age group* (years)	Events in the sample	Sample size	Prevalence** in the sample	Population size	Estimated events in the population
Females					
25-44	7	77 624	9 (4-19)	8 789 771	791
45-64	167	59 601	280 (240-327)	7 364 720	20 621
≥ 65	714	56 178	1271 (1181-1368)	6 142 415	78 070
Total	888	193 403	459 (430-491)	22 296 906	102 343
Males					
25-44	71	75 544	94 (74-119)	8 957 598	8420
45-64	993	58 051	1711 (1607-1820)	7 062 488	120 839
≥ 65	1634	42 976	3802 (3624-3988)	4 221 044	160 484
Total	2698	176 571	1528 (1472-1587)	20 241 130	309 284
Total					
25-44	78	153 168	51 (40-64)	17 747 369	9051
45-64	1161§	117 652	987 (931-1045)	14 427 208	142 397
≥ 65	2349§	99 154	2369 (2276-2466)	10 363 459	245 510
Total	3588	369 974	970 (939-1002)	42 538 036	412 619

* no subject in the sample had an age of < 25 years; ** prevalence per 100 000 with 95% confidence interval; population base: subjects > 24 years of age recorded as having had history of myocardial infarction; § for one subject the age but not the gender is known; not computed into the gender-specific section.

We compared our age-adjusted prevalence rates to those published by Giampaoli et al.[5]; results are summarized in table IV. A small difference in the estimated incidence among men (HSD +1.6% as cases, +5.4% as ASR) was detected, and a more appreciable difference was present among women (+20.5% as cases and +29.3% as ASR).

For the age segment 35-74 years the prevalence of MI in our sample is 1.48% for men and 0.29% for women.

Discussion

The prevalence of recorded diagnosis of MI in our database in subjects ≥ 25 years is very close to that reported by ISTAT according to geographical regions. The main discrepancies between our and ISTAT data are observed for elderly subjects (≥ 75 years), who have a higher prevalence according to the ISTAT report (data not shown). We can speculate that, for old and very old people, the recall of a past event upon interview

Table III. Number of prevalent patients with history of myocardial infarction by geographic area.

Region	25-64 years		65-74 years		> 75 years	
	Cases	ASR	Cases	ASR	Cases	ASR
Males						
Italy*	121 577	75.9	102 180	389.9	54 681	341.6
North	57 547	185.3	50 525	412.5	28 609	387.5
Center	24 970	46.1	22 436	412.6	12 685	361.1
South	40 361	25.2	30 445	357.4	13 383	261.9
Females						
Italy*	20 235	12.5	31 881	16.4	38 275	132.0
North	10 507	14.2	20 138	22.5	19 881	136.5
Center	3912	12.3	6083	15.8	8859	145.4
South	7171	12.9	7419	11.2	10 090	121.2

ASR = age-standardized rate. * the overall estimate, based on the distribution of the total population, differs from the sum of the estimates for each individual areas. The sum, due to the unbalanced distribution of age and gender segments across geographic areas, overestimates the prevalence by 0 to 1.1% among men, and by 1.5 to 6.7% among women.

Table IV. Regional age-standardized rates (ASR) for myocardial infarction: comparison of data between Health Search Database and an epidemiological survey.

Region	Health Search Database		Giampaoli et al.[5]	
	Cases	ASR	Cases	ASR
Males				
Italy*	223 757	120.0	220 183	113.9
North	108 072	123.9	107 764	117.1
Center	47 406	129.9	41 940	106.3
South	70 806	113.0	70 095	113.2
Females				
Italy*	52 116	26.9	43 263	20.8
North	30 645	34.3	19 344	19.5
Center	9995	26.0	8056	18.9
South	14 590	22.1	15 818	23.8

* the overall estimate, based on the distribution of the total population, differs from the sum of the estimates for each individual areas, due to the unbalanced distribution of age and gender segments across geographic areas.

may not be very accurate, leading to an overestimate of a feared disease such as MI. The presence of a diagnosis of MI in the database does not guarantee its correctness, but only that the physician was confident enough to take the professional and legal responsibility to record it. It is reasonable to assume that GP's recorded diagnosis is more accurate than that reported by the patient. Interesting similar trends have been reported in an Italian population aged 65-84 years of age[7] and by Klungel et al.[8] in The Netherlands in a young population, and O'Donnell et al.[9] in the United States.

In comparison with the published data[5], our estimated prevalence is very similar to the projected prevalence for men (< 2% difference in total prevalent cases) with some discrepancies for Central Italy. On the other hand appreciable differences were found among women with a substantially higher estimated number of prevalent cases and of prevalence rates, especially in Northern Italy (Table III). Giampaoli et al.[5] used for their projections, as compared to us, a less recent ISTAT report. Population dynamics may therefore account, at least in part, for these discrepancies.

Nevertheless, based on the total estimated prevalent cases in Italy, the number of estimated prevalent MI from HSD data differs from the Giampaoli's projection by 12 427 cases (males plus females), that is < 5%. This is largely within the range of any extrapolation based on a different population. More recent data on the Italian population[6], derived from almost 10 000 subjects, show a prevalence of MI for the population aged 35-74 years very close to ours for men (1.5 vs 1.48%) and similar for women (0.4 vs 0.29%). The difference for women might be the result of the limited number of MI cases identified among the population described (about 20 prevalent cases in women).

HSD has some limits; the most important are: a) only recorded diagnosis can be extracted, and b) no validation of the diagnosis is possible. In spite of these limitations, HSD seems to be as accurate as other well-established methods in evaluating the prevalence of MI.

Queries of the database can represent therefore a quick, inexpensive, and fairly accurate method to estimate and monitor the prevalence of MI in Italy. Other valuable information can also be obtained such as time from the acute event. This information can be useful whenever secondary prevention interventions are surveyed and/or planned.

In conclusion, the prevalence of diagnosis of MI in the HSD is very close to those obtained by other methods. Querying the database can provide a simple and inexpensive way to estimate and monitor the prevalence of MI in Italy.

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