Fast-track article

Global cardiovascular risk evaluation in Italy: a cross-sectional survey in general practice

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Hypercholesterolemia; Hypertension; Risk factors.

Background. **The aim of our work was to evaluate, in a general practice setting, the attitude of general practitioners in determining the individual coronary risk.**

Methods. **The coronary risk was determined among patients aged 30 to 74 years using the following parameters: gender, age, smoking habits, diagnosis of diabetes mellitus, systolic blood pressure, and total cholesterol. We evaluated the records of 446 331 subjects collected by 481 general practitioners working throughout Italy.**

Results. **Except for age, gender and diabetes mellitus, risk factors were largely under-recorded: blood pressure in 37.0% of the total patients, total cholesterol in 34.3%, smoking habits in 21.9%. Recording was substantially low even in patients who were prescribed with antihypertensive drugs and/or lipid-lowering drugs: blood pressure in 80.6% of the patients, total cholesterol in 69.1%, smoking habits in 46.1%. Cardiovascular risk factors were more frequently recorded as age increased and slightly more among women as compared to men. Obviously, it is possible that risk factors had been assessed but not recorded.**

Conclusions. **Cardiovascular risk factors are substantially under-recorded among Italian general practitioners thus impairing adequate preventive treatment. A systematic, well programmed approach may theoretically lead to evaluate the majority of the target population within a few years.**

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The work was performed in a general practice setting.

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Introduction

The prevention of cardiovascular disease is a top priority for the Italian Health System. According to the guidelines[1,2], primary prevention must be referred to the global coronary risk, which is easily calculated using computer[3], from risk charts, or from tables which attribute "points" to the different risk factors. Albeit several algorithms are available[4,5], only six risk factors are always necessary: age, gender, presence of diabetes mellitus (yes or no), smoking habit (yes or no), systolic blood pressure, and serum total cholesterol. At the moment, no screening strategy is recommended for identifying high-risk subjects, but the recommendations are that all adults aged > 20 years should have their cholesterol and/or blood pressure checked every 5 years as suggested by the ATP III guidelines[2] and by the British Hypertension Society guidelines[6] respectively. European guidelines[7] simply offer the reminder that cardiovascular risk evaluation is particularly advantageous for people aged 40-69. In any case, cardiovascular risk must be calculated for patients without cardiovascular disease (or equivalent) whenever intensive non-pharmacological intervention and/or pharmacological therapy are being considered. According to international guidelines[8,9], cardiovascular risk is an essential element in the management of hypertensive patients, and accordingly, these subjects should have their serum lipid levels and smoking habits recorded.

Primary cardiovascular prevention relies first and foremost on primary care, but in reality, general practitioners (GPs) seem to experience serious difficulties in evaluating the vast majority of their adult patients[10], and even the cost advantages and/or effectiveness of this practice have been questioned in some quarters[11]. In Italy, there are many regional health plans designed to tackle the problem of primary cardiovascular prevention; to our knowledge, however, no data are available concerning the attitude of Italian GPs toward cardiovascular risk evaluation and the additional workload involved in implementing these plans. We sought to obtain this information by querying the database of the Italian College of GPs.

Methods

The Health Search Database (HSD), which is owned by the Italian College of GPs, currently contains data of over 550 Italian GPs covering a patient population of more than 800 000 individuals. After intensive training, all participating GPs began using the same software to record data during their normal daily clinical practice. The software system encodes all diagnostic records according to the ninth edition of the International Classification of Diseases (ICD-9). Prescription records are also encoded according to the Anatomical Therapeutic Chemical (ATC) classification system. Each patient's personal details, medical records (e.g. diagnoses, tests, hospitalization, etc.), drug therapy and prevention records are linked anonymously by a unique reference number in such a way that no identification is possible.

The study was carried out using data extracted on February 1, 2002 from the HSD. When queried, the HSD contained data from 481 GPs. The GPs did not receive any incentive nor did they know which data would be extracted, but they all voluntarily agreed to take part in the project to record their daily activities as completely as possible, using only the IT support and not any other recording and/or filing systems. The software employed, used by around 8000 Italian GPs, was developed to satisfy the requirements of normal daily practice and not for clinical research.

We extracted the data of all living subjects aged 30-74 years with no recorded cardiovascular diseases. The 5 years before the day of the query were examined to verify the history of blood pressure, total cholesterol and HDL cholesterol values, smoking habits, and the diagnosis of diabetes mellitus. We also extracted the prescription data regarding antihypertensive drugs (ATC code C03 for diuretics, C07 for beta-blockers, C08 for calcium antagonists, C09 for renin-angiotensin inhibitors, C02 for other antihypertensive drugs) and lipid-lowering drugs (ATC code C10) during the 12 months preceding the query.

Statistical analysis. Continuous variables are expressed as mean value ± SD. The statistical significance of proportions was calculated using Pearson's χ^2 test. The χ^2 test was also used to compare the distribution by age between the study population and the Italian population. All quoted p values are two-sided; p values < 0.05 were considered as statistically significant. All statistical analyses were conducted using SPSS 10.0 for Windows (SPSS Inc., Chicago, IL, USA).

Results

The data of 446 331 subjects were extracted, comprising 211 897 males (average age 48.7 ± 12.4 years) and 234 434 females (average age 49.7 ± 12.9 years). A comparison between the demographic characteristics of our population and those of the whole Italian population (ISTAT National Institute of Statistics, http://demo.istat.it/index.html) is illustrated in figure 1. The distribution by age was significantly different both in males and in females: our study population was slightly younger than the Italian population as a whole. The prevalence of recorded risk factors, stratified by age and gender, is shown in table I. The prevalence of the recorded factors considered increased significantly with age, and was always significantly greater in females than in males, with the exception of the smoking habit in the group aged 65-74 years, which did not present significantly different values, and the presence of diabetes mellitus which was significantly greater in males with respect to females in all three age groups.

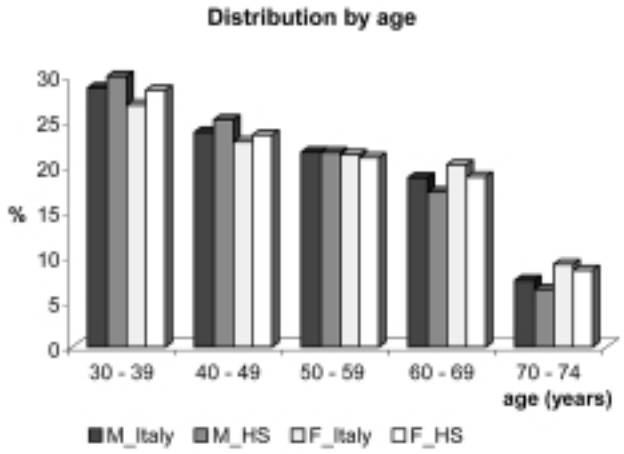

Figure 1. *Demographic characteristics of the observed population (male HS and female HS) compared to the whole Italian population (males Italy and females Italy). HS = Health Search database.*

Table I. Recorded risk factors stratified by age and gender: entire observed population.

Risk factor	30-49 years (%)		50-64 years (%)		65-74 years (%)	
	Males	Females	Males	Females	Males	Females
Blood pressure	21.6	28.9	41.7	50.3	54.9	60.9
Total cholesterol	21.7	26.1	40.0	46.1	49.6	54.0
HDL cholesterol	12.2	13.1	26.3	29.4	31.9	35.0
Diabetes mellitus	1.0	0.6	5.2	3.8	7.5	6.6
Smoking habits	17.0	19.0	24.5	26.0	28.5	28.1

The same analysis was conducted on subjects with no recorded prescription of antihypertensive and/or lipid-lowering drugs, and on patients for whom such prescriptions were recorded. Antihypertensive and/or lipid-lowering drugs had been prescribed for 38 816 patients (8.7%), of whom 17 281 were male (8.2% of all males) and 21 535 were female (9.2% of all females). The results are shown in table II: the various risk factors recorded were significantly more frequent among subjects already being treated pharmacologically with respect to non-treated subjects.

At least one blood pressure recording was available for 165 068 subjects, 31 289 (18.9%) of whom were under treatment with antihypertensive drugs. The distribution of the blood pressure levels (Table III) was significantly different in the two groups of subjects: 56.8% of non-treated subjects had a normal blood pressure compared with only 34% of treated patients. At least one total cholesterol measurement was available for 153 268 subjects, 26 832 (17.5%) of whom were under treatment with lipid-lowering drugs. The distribution of the total cholesterol levels (Table IV) was significantly different between non-treated and treated subjects, with a tendency toward higher values in the latter group despite treatment. The determination of the cardiovascular risk was possible for 44 943 subjects (Table V), 12 953 (28.8%) of whom were under treatment with antihypertensive and/or lipid-lowering drugs. The distribution of the risk classes was significantly different between non-treated and treated patients, the latter still at a higher risk level despite pharmacological treatment.

Table II. Recorded risk factors: comparison between 407 515 subjects without and 38 816 patients with antihypertensive and/or lipid-lowering drug prescriptions.

Risk factor	Non-treated (%)	Treated (%)
Blood pressure	32.8	80.6
Total cholesterol	31.0	69.1
HDL cholesterol	17.9	49.9
Diabetes mellitus	2.2	10.4
Smoking habits	19.6	46.1

Non-treated vs treated: $p < 0.001$ for all risk factors.

Table III. Comparison between non-treated subjects and patients treated with antihypertensive drugs at different stages of hypertension.

Level of blood pressure	Non-treated	Treated
Optimal	16 378 (12.1%)	683 (2.3%)
Normal	30 455 (22.5%)	3031 (10.2%)
Normal-high	29 914 (22.1%)	5853 (19.7%)
Stage 1	43 449 (32.1%)	13 489 (45.4%)
Stage 2	12 723 (9.4%)	5259 (17.7%)
Stage 3	2437 (1.8%)	1397 (4.7%)
Total	135 356 (100%)	29 712 (100%)

Non-treated vs treated: $p < 0.001$.

Table IV. Comparison between non-treated subjects and patients treated with lipid-lowering drugs.

Level of total cholesterol	Non-treated	Treated
< 200 mg/dl	52 563 (36.1%)	1885 (24.6%)
200-250 mg/dl	63 629 (43.7%)	3111 (40.6%)
> 250 mg/dl	29 413 (20.2%)	2667 (34.8%)
Total	145 605 (100%)	7663 (100%)

Non-treated vs treated: $p < 0.001$.

Table V. Levels of coronary risk among the patients who could be evaluated.

Coronary risk	Non-treated	Treated*
Low	6205 (20.3%)	494 (3.8%)
Mild	7625 (23.8%)	2154 (16.6%)
Moderate	11 589 (36.2%)	6063 (46.8%)
High	6135 (19.2%)	4114 (31.8%)
Very high	136 (0.5%)	128 (1.0%)
Total	31 690 (100%)	12 953 (100%)

* with antihypertensive drugs and/or lipid-lowering drugs. Non-treated vs treated: $p < 0.001$.

Discussion

Cardiovascular risk evaluation is the cornerstone of primary prevention, both for individual and population strategies, particularly when pharmacological intervention is being considered[1,2]. Whilst there are various methods[1,2,4,5] that can be used to estimate the probability of developing a future coronary cardiovascular event, all require the same set of data: gender, age, smoking habits, diagnosis of diabetes mellitus, blood pressure, total cholesterol. Since blood pressure measurement and information on the patient's lifestyle are easily obtained every time a doctor visits a patient, cholesterol determination is the only item requiring a "technological" assessment. Thus, the interdependent parameters of "direct doctor evaluation" and "blood sample evaluation" remain fundamental even if other data, such as family history, the use of antihypertensive drugs and the levels of HDL cholesterol or blood glucose are added to the basic model. According to current guidelines[1,2], millions of adults with no overt cardiovascular disease should have their personal cardiovascular risk evaluated. The burden of this apparently easy task falls mainly on GPs, at least in countries with an efficient public health service. A recent survey among British practices[10] showed such a substantial under-

recording of cardiovascular risk factors that Toop and Richards[11] entitled their companion editorial "Preventing cardiovascular disease in primary care. Targets are fine in principle, but unrealistic". The British prevention goals (national service framework for cardiovascular disease) are similar to the Italian, and for this reason we studied the recording pattern of cardiovascular risk factors among GPs who volunteered to participate in the research network of the Italian College of GPs and who, therefore, were trained to register their daily office activities. In theory, the performance of these selected GPs should be better than that of the average Italian GP, and yet risk factors were largely under-recorded among their patients aged 30 to 74 years: for blood pressure, total cholesterol, HDL cholesterol and smoking habits, the percentages were 37.0, 34.3, 20.7 and 21.9% respectively. It is worth noting that, rather surprisingly, recording activity was substantially low even for subjects who were prescribed antihypertensive and/or lipid-lowering drugs: blood pressure 80.6%, total cholesterol 69.1%, HDL cholesterol 49.9%, smoking habits 46.1%. Cardiovascular risk factors were more frequently recorded as age increased, and slightly more for females than for males.

It is possible that the risk factors had been assessed, but not recorded. Some patients with hypertension or high blood cholesterol levels could have been in the care of specialists and, therefore, some information might not have been available to the GPs. It is also well known that a percentage of patients sent for blood tests will fail to go for the test or forget to report the results to the GP. Even though this may be true for many subjects, the lack of recorded data impairs risk calculations and reflects a low level of awareness as far as cardiovascular coronary prevention is concerned. This problem is also shared by specialists, and impacts on secondary prevention: at hospital discharge, smoking habits, blood pressure and cholesterol values were recorded in 60.5, 49.6 and 42.4% respectively of cases[12]. Among our study patients, the levels of HDL cholesterol were less frequently available than those of total cholesterol. This is not surprising, since European risk charts[1] did not include HDL cholesterol; however, the under-use of HDL cholesterol data may lead to substantial inaccuracies in cardiovascular risk evaluation in our population and substantially impair the use of LDL cholesterol levels as a target for therapeutic interventions, as suggested by the guidelines[2].

The main limitation of our study, associated with GP selection, is a probable overestimation of the extent to which cardiovascular risk factors are recorded. Nonetheless, we believe that our data may contribute to the planning of the intervention designed to extend cardiovascular risk assessment. Since, within a given 3-year period, more than 90% of citizens contact their GPs (HSD, unpublished data), the vast majority of the target population could be evaluated if a suitably systematic, opportunistic approach were adopted to take advantage of this statistic. It must be remembered that collecting information about cardiovascular risk factors and prescribing laboratory tests is a time-consuming task that goes far beyond the mechanics of questioning and writing; explanations must be given and the patient must be actively involved in the problem of prevention, thus establishing a sound basis for future patient-doctor collaboration. Given the great number of subjects to be screened, there would probably be a case for setting age-segment priorities: for example, attention could be given first to subjects aged 50-70 years in order to identify high-risk patients. Another possible approach could be to focus on diabetics, hypertensive patients and relatives of subjects affected by familial dyslipidemias or early-age onset cardiovascular events. If previously obtained data are to be used, information should be provided, at least in the case of total cholesterol, concerning the limited accuracy of non-recent determinations. The use of electronic automatic reminders probably should also be encouraged. It is worth remembering that an improved cardiovascular risk evaluation will be accompanied by increasing treatment costs[13], and with this in mind, adequate resources must be made available before GPs are "strongly invited" to evaluate the cardiovascular risk among their patients.

In conclusion, cardiovascular risk factors are substantially under-recorded by Italian GPs, thus impairing cardiovascular risk evaluation and, consequently, adequate preventive treatment. In theory, a systematic, opportunistic approach could lead to the majority of the target population being evaluated within a few years. Since millions of Italians would be involved, priorities should be set and GPs given educational and structural support.

The daily work of a GP who wants to carry out all the activities foreseen for the job currently means that the management of chronic diseases is poorly organized and not geared toward the achievement of well-defined objectives. Medical initiative programs must therefore be developed within a general practice setting with the aim of integrating general activities and specialist activities. Above all, these programs must be appropriately supported by the health authorities.

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