Awareness and control of hypertension and hypercholesterolaemia in France and Northern Ireland


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Summary

We assessed awareness and control of hypertension and hypercholesterolaemia in a cross-sectional study of 586 men from France and 189 from Northern Ireland, aged 35–55, without known coronary artery disease. Prevalence of hypertension was 28% in France and 31% in Northern Ireland (p < 0.42). In France, 70% of hypertensive subjects were aware of their status, vs. 58% in Northern Ireland (p < 0.10). Overall, 40% of subjects with a history of hypertension were untreated, and only 32% of the French and 12% of the Northern Irish subjects treated for hypertension (diet with/without drugs) were normotensive. The prevalence of hypercholesterolaemia was 46% in France and 48% in Northern Ireland (p < 0.62). In France, 59% of hypercholesterolaemic subjects were aware of their status, vs. only 17% in Northern Ireland (p < 0.0001). In both countries, half of those with a history of hypercholesterolaemia were untreated, and only 47% of the French and 43% of the Northern Irish patients treated for hypercholesterolaemia (diet with/without drugs) were controlled. While awareness of hypertension is comparable in France and Northern Ireland, awareness of hypercholesterolaemia is much lower in the latter. Control of hypertension and hypercholesterolaemia in both countries is poor and should be improved.

Introduction

There is now strong evidence that lowering high blood pressure and cholesterol levels reduces cardiovascular disease morbidity and mortality.1–3 International guidelines for the management of those two risk factors have been issued, which include dietary and drug intervention.4–9 Dietary intervention should be started first, and pharmacological treatment should only be added if dietary intervention proves unsuccessful. Nevertheless, individual awareness of hypertension and hypercholesterolaemia is low, their medical treatment sometimes differs from that recommended by international guidelines, and control is only achieved in a small fraction of treated subjects.10–15

In this study, we assessed the prevalence, awareness and management of hypertension and hypercholesterolaemia in middle-aged men in France and Northern Ireland who acted as controls in the ECTIM (Etude Cas-Témoin de l’Infarctus du Myocarde) Study.

Methods

Study populations and sampling of controls

Full details of the populations studied have been published elsewhere.16,17 Briefly, the ECTIM controls...
were recruited to a large case-control study of myocardial infarction between 1988 and 1991 in four regions participating in the MONICA Project: one in Northern Ireland (Belfast) and three in France (Toulouse, Lille and Strasbourg). Subjects were recruited from the electoral rolls in France, and from the lists of general practitioners held by the Central Services Agency in Northern Ireland. Among the eligible control subjects, 40% in Belfast, 54% in Strasbourg, 49% in Toulouse, and 47% in Lille refused to take part, did not respond, or could not be traced. Informed consent was obtained from all subjects.

Data collection

In Northern Ireland, subjects were invited to attend a clinic, whereas French participants were visited at home for clinical investigation by specially trained medical staff. All subjects completed a questionnaire on medical history, dietary intervention, drug intake and smoking status. A positive history of hypertension or hypercholesterolaemia was considered if the subject answered ‘yes’ to the questions ‘did a doctor tell you that you had a raised blood pressure level or that you were hypertensive?’, or ‘did a doctor ever tell you that you had an excessive level of cholesterol or triglyceride in the blood, or did you ever have a cholesterol or triglyceride level higher than 6.5 mmol/l?’.

Blood pressure measurements were performed in duplicate according to the British Hypertension Society recommendations, using a random zero sphygmomanometer. Clinical hypertension was defined as a systolic blood pressure $\geq 160$ mmHg and/or a diastolic blood pressure $\geq 95$ mmHg and/or on medication. Treated hypertensives were considered as controlled if their systolic blood pressure was $\leq 140$ mmHg and their diastolic blood pressure was $\leq 90$ mmHg.

Plasma lipids and lipoproteins were measured centrally in a single laboratory using enzymic methods (Boehringer Mannheim) adapted to a Hitachi 705 analyser. Clinical hypercholesterolaemia was defined as a total cholesterol $\geq 6.5$ mmol/l and/or an LDL cholesterol $\geq 4.2$ mmol/l and/or on hypolipidaemic therapy. Subjects treated for hypercholesterolaemia were taken to be controlled if their cholesterol and LDL levels were $\leq 6.2$ mmol/l and $\leq 4.1$ mmol/l, respectively.

Statistical analysis

Statistical analyses used EPI-INFO and SAS software. Subjects with a previous history of angina or myocardial infarction were excluded. Logarithmically-transformed values of triglyceride were used in the analyses. Quantitative data were analysed by Student’s $t$ test. Qualitative data were analysed by the $\chi^2$ test or Fisher’s exact test. Due to the number of statistical comparisons made, significance was set at the $p<0.01$ level.

Results

Subject characteristics

In total, data for 775 subjects were analysed: 586 from France and 189 from Northern Ireland. Their clinical characteristics are summarized in Table 1. Those in Northern Ireland had a higher systolic blood pressure than those in France, while more French than Northern Irish subjects reported a history of diabetes, but since no glucose measurements were performed, comparisons of hyperglycaemic status could not be made. Conversely, no differences were found for age and body mass index, frequency of

<table>
<thead>
<tr>
<th>Table 1 Subject characteristics</th>
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<tbody>
<tr>
<td>France ($n=586$)</td>
</tr>
<tr>
<td>Age (years)</td>
</tr>
<tr>
<td>Body mass index (kg/m$^2$)</td>
</tr>
<tr>
<td>Smokers (%)</td>
</tr>
<tr>
<td>Diabetes (%)</td>
</tr>
<tr>
<td>Systolic BP (mmHg)</td>
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<tr>
<td>Diastolic BP (mmHg)</td>
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<tr>
<td>Hypertension: Clinical (%)</td>
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<tr>
<td>History (%)</td>
</tr>
<tr>
<td>Total cholesterol (mmol/l)</td>
</tr>
<tr>
<td>Triglycerides (mmol/l)</td>
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<tr>
<td>HDL cholesterol (mmol/l)</td>
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<tr>
<td>LDL cholesterol (mmol/l)</td>
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<tr>
<td>Hypercholesterolaemia: Clinical (%)</td>
</tr>
<tr>
<td>History (%)</td>
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</tbody>
</table>

Results are means ± SD or percentages (number of subjects). Clinical hypertension is defined as (SBP $\geq 160$ mmHg and/or DBP $\geq 95$ mmHg and/or on medication); clinical hypercholesterolaemia is defined as a total cholesterol $\geq 6.5$ mmol/l and/or an LDL cholesterol $\geq 4.2$ mmol/l and/or on hypolipidaemic therapy. Analysis by Student’s $t$ test or $\chi^2$ test: $^*p<0.005; ^{***}p<0.001$. 


smoking, and the levels of diastolic blood pressure or lipid values.

Frequency and treatment of hypertension

The prevalence of hypertension (SBP \( \geq 160 \) mmHg and/or DBP \( \geq 95 \) mmHg and/or on medication) was 28% (165/586) in France and 31% (59/189) in Northern Ireland \( (p<0.42, \text{Table 1}) \). In France, 70% (115/165) of those with hypertension were aware of their status, vs. 58% (34/59) in Northern Ireland \( (\chi^2 = 2.84, p<0.10) \). Conversely, the proportion who had been told that they had hypertension was 28% (163/586) in France and 22% (41/189) in Northern Ireland \( (p<0.10) \). In France, 11% (48/421) of subjects classified as normotensive reported being told on one or more occasions that they were hypertensive; the level was 5% (7/130) in Northern Ireland. These subjects were thus considered as having a history of hypertension in the statistical analysis.

In both countries, 4/10 subjects with a history of hypertension had neither dietary nor drug treatment, and less than 1/10 subjects received dietary advice (Table 2). Half of those with a history of hypertension received medical treatment alone. When drug treatment was compared, ACE inhibitors were prescribed significantly more often in France than in Northern Ireland, while no differences were observed for diuretics, beta-blockers, calcium channel blockers or other antihypertensive drugs (Table 3). Finally, 32% (31/98) and 12% (3/25) of the treated hypertensives (diet and/or drugs) had controlled blood pressure in France and Northern Ireland, respectively.

Frequency and treatment of hypercholesterolaemia

The prevalence of hypercholesterolaemia (total cholesterol \( \geq 6.5 \) mmol/l and/or a LDL-cholesterol \( \geq 4.2 \) mmol/l and/or on hypolipidaemic therapy) was 46% (267/586) in France and 48% (90/189) in Northern Ireland \( (p<0.62, \text{Table 1}) \). In France 59% (158/267) of the subjects with hypercholesterolaemia were aware of their status, vs. only 17% (15/90) in Northern Ireland \( (\chi^2 = 48.70, p<0.0001) \). Conversely, the proportion of subjects who had been told that they had hypercholesterolaemia was 39% (230/586) in France vs. only 13% (24/189) in Northern Ireland \( (p<0.0001, \text{Table 1}) \). Furthermore, of those classified as normocholesterolaemic, 23% (72/319) in France and 9% (9/99) in Northern Ireland reported being told on one or more occasions that they were hypercholesterolaemic. As in the case of hypertension, they were considered as presenting a history of hypercholesterolaemia in the statistical analysis.

In both countries, half of the subjects with a history of hypercholesterolaemia received neither dietary nor medical treatment, but the frequency of dietary treatment was greater than that for hypertension (Table 4). Since the number of medically-treated subjects was very low in Northern Ireland, no comparison was drawn between the two countries. Finally, 47% (52/111) and 38% (5/13) of treated hypercholesterolaemic subjects (diet with/without treatment) were aware of their status, and 55% (57/105) and 54% (4/7) were told of their status in France and Northern Ireland respectively.

### Table 3 Drug treatment of hypertension in France and Northern Ireland

<table>
<thead>
<tr>
<th></th>
<th>France ( (n=92) )</th>
<th>Northern Ireland ( (n=22) )</th>
<th>Test value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diuretics</td>
<td>47 (43)</td>
<td>59 (13)</td>
<td>1.08</td>
</tr>
<tr>
<td>Beta-blockers</td>
<td>36 (33)</td>
<td>36 (8)</td>
<td>0.002</td>
</tr>
<tr>
<td>Calcium-channel blockers</td>
<td>21 (19)</td>
<td>18 (4)</td>
<td>( p=1.00 )</td>
</tr>
<tr>
<td>ACE inhibitors</td>
<td>42 (39)</td>
<td>9 (2)</td>
<td>8.548***</td>
</tr>
<tr>
<td>Other</td>
<td>12 (11)</td>
<td>14 (3)</td>
<td>( p=0.732 )</td>
</tr>
</tbody>
</table>

Data for subjects treated with antihypertensive drugs only. Results are percentages (number of subjects). Percentages are more than 100 due to multiple treatments. Analysis by \( \chi^2 \) test or Fisher's exact test. "\( p<0.005 \).
drugs) had their lipid levels adequately controlled in France and Northern Ireland, respectively.

Discussion

In this study, the prevalence of hypertension was comparable in France and Northern Ireland. In both countries, about two-thirds of the hypertensive subjects were aware of their status, of which another 60% received medical and/or dietary advice. The results are in agreement with other studies conducted in the USA\textsuperscript{15} and in Scotland.\textsuperscript{20} However, fewer than 30% of the treated subjects had been given dietary advice, which is in breach of the published guidelines for antihypertensive treatment. Moreover, less than one third of the treated hypertensives had adequate blood pressure control, which suggests either poor compliance with the treatment by the patient or inadequate drug prescription. Nevertheless, when drug treatments were analysed, diuretics and beta-blockers were the most frequently prescribed drugs in both countries, in accordance with the drug treatment guidelines for hypertension at the time.\textsuperscript{21,22} Hence, the main reason for the limited success of antihypertensive treatment could be poor compliance of patients with medical and dietary treatment, as has been shown in patients with congestive heart failure\textsuperscript{23} and cerebrovascular disease.\textsuperscript{24} The higher rate of prescription of ACE inhibitors in the French hypertensives is in agreement with a previous report,\textsuperscript{25} but the reasons for such a choice by French general practitioners are still unknown.

As in the case of hypertension, the prevalence of hypercholesterolaemia was comparable in France and Northern Ireland, but personal awareness was significantly lower in Northern Ireland than in France. These results are in agreement with previous studies,\textsuperscript{11,25} and indicate that screening for hypercholesterolaemia by general practitioners in Northern Ireland is relatively low and could be improved. Nevertheless, because the French consensus on hyperlipidaemia was only published in mid 1989,\textsuperscript{26} an alternative explanation could be a difference in the definition of hyperlipidaemia by Northern Irish and French physicians. This could also explain the relatively high frequency of subjects considered as normolipaemic but reporting a history of hypercholesterolaemia in France.

Half of those with a history of hypercholesterolaemia had neither dietary nor medical treatment, and only half of those treated had their cholesterol levels controlled. The reason for the low rate of dietary advice could again be due either to an absence of dietary advice from the general practitioner or to a lack of compliance by the subjects.\textsuperscript{27} The latter could also explain the low efficacy of treatment reflected in the cholesterol levels.

In this study, we assessed the treatment and control of hypertension or hypercholesterolaemia only in subjects who had been previously so diagnosed. This was to assess the consequences of the diagnosis of hypertension or hypercholesterolaemia on patient management. Our results are thus relatively optimistic, since they only apply to previously detected patients and not to all hypertensive or hypercholesterolaemic subjects. However, they indicate that the diagnosis of hypertension or hypercholesterolaemia does not necessarily lead to preventive measures in France or Northern Ireland. The reasons for this lack of preventive action await further investigation.

Recent epidemiological data show that myocardial infarction incidence and mortality in Northern Ireland is more than three times higher than in France.\textsuperscript{18} Although the reason for this difference is not clearly understood, it is unlikely that it could be due to a better screening and treatment of these two major cardiovascular risk factors in France. Firstly, although the French subjects had better awareness of their cholesterol status and received more treatment than the Northern Irish, the mean total and HDL cholesterol levels were not significantly different between the two countries. Secondly, although the French subjects had a significantly lower level of systolic blood pressure, this difference could not account for all the difference in myocardial infarction mortality between the two countries. Further, it has been shown that a decrease in the risk of myocardial infarction is only achieved by consistent and prolonged decrease in blood pressure,\textsuperscript{22,28} and this study shows that less than half of the treated hypertensives were adequately controlled. Hence, it is unlikely that the differences in awareness and treatment of hypertension and hypercholesterolaemia account for the large differences in myocardial infarction incidence between the two countries.

In summary, these findings indicate the need to improve screening for hypercholesterolaemia in Northern Ireland, and to reinforce dietary management of hypertension and hypercholesterolaemia in both France and Northern Ireland. The reasons for the low efficacy of hypertension and hypercholesterolaemia treatment in both countries should be further investigated.

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References


