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Cholesterol management in Dutch general practice

A comparison with national guidelines

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Objective – To examine cholesterol diagnosis and treatment by Dutch general practitioners (GPs) in the period before publication of national guidelines, in order to develop implementation strategies based on discrepancies found between daily practice and the guidelines.

Design – Data of the 'Dutch National Survey of General Practice', in which GPs were involved in extensive consultation registration, were used. Patients were included for analysis if serum cholesterol, or the ICPC-code lipid metabolism disorder, or cholesterol-lowering treatment was registered.

Setting – General practice.

Participants – 161 GPs, 177 practice-nurses.

Outcome measures – Reasons for consultation, diagnoses, therapy, inter-doctor variation.

Results – The main discrepancies between daily practice and the guidelines concerned indications for cholesterol measurement, repeated measurements to diagnose hypercholesterolaemia, and attention for diet advice. A remarkable inter-doctor variation in diagnosis, and less so in treatment, was also found.

Conclusion – The inter-doctor variation justifies the publication of the standard guidelines. Implementation strategies should aim at indications for cholesterol testing, repeating measurements for diagnosis, and advice on diet.

Key words: cholesterol, general practice, guidelines, implementation.

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The publishing of the results of important cholesterol intervention studies in the 1980s (1,2) stimulated consensus meetings in various countries. In addition there are developments such as the introduction of new cholesterol-lowering medication and the portable capillary blood-testing device for cholesterol measurement. These developments (3)

prompted the Dutch College of General Practitioners to set a well-balanced (4) standard for hypercholesterolaemia, which was published in November 1991 (5). Reservedness in screening and drug therapy characterizes this standard (Fig. 1).

Meanwhile the cholesterol topic is still contro-

Figure 1. The cholesterol guidelines of the Dutch College of GPs**Screening:**

Selective case finding; men and women, 18–65 yrs, with one of the following risk factors; signs of familial hypercholesterolaemia (xanthoma, xanthelasmata/arcus senilis before the age of 40), CHD in patient history, CHD in sibling or parent while younger than 60, hypertension, diabetes mellitus, familial hyperlipidaemia in the family.

Diagnosis:

The mean of 3 total cholesterol tests \geq than 6.5 mmol/l. Determination of HDL and triglycerides only in case cholesterol lowering drugs are being considered.

Management:

< 6.5 mmol/l: general advice about low-fat diet

> 10.0: consultation of an internist

6.5–10.0: diet therapy, with support, for 6 months; referral to dietist if unsuccessful.

Drugs may be considered if, after 6 or 12 months of diet therapy, serum cholesterol is:

6.5–7.9 mmol/l and \geq 2 risk factors (as defined under screening)

8.0–10.0 mmol/l and \geq 1 risk factor(s)

Target level: 6.5 mmol/l

versial (6–8), and there is no consensus in the literature as to which screening strategy is to be preferred in general practice (9).

Not much is known about the usual cholesterol care by Dutch GPs. A description of the usual cholesterol care, including the inter-doctor variation, in the period prior to publication of the guidelines, serves various purposes; it may show problems with the feasibility of the guidelines. It might also increase insight into deficiencies in the provided care and points of attention for implementation of the standard (10).

In this study we present findings on the following questions:

1. Who were the patients, in the period prior to publication of the guidelines, whose serum cholesterol was tested by the GP, and how was hypercholesterolaemia diagnosed? How was the inter-doctor variation?
2. How were patients with hypercholesterolaemia treated by their GP in the period prior to publication of the guidelines? How was the inter-doctor variation?

Material and methods

Data of the 'Dutch National Survey of General Practice' (11) were used to answer these questions. In this survey, 161 GPs and 177 practice-nurses, working in 103 Dutch practices serving 335000 patients, registered all doctor-patient or

nurse-patient contacts during a period of three months. The survey, lasting from April 1987 to March 1988, consisted of four consecutive registration periods of three months each to account for seasonal influences. Selection of participating GPs was based on a stratified (according to region, urbanization, and distance to a general hospital) random sample.

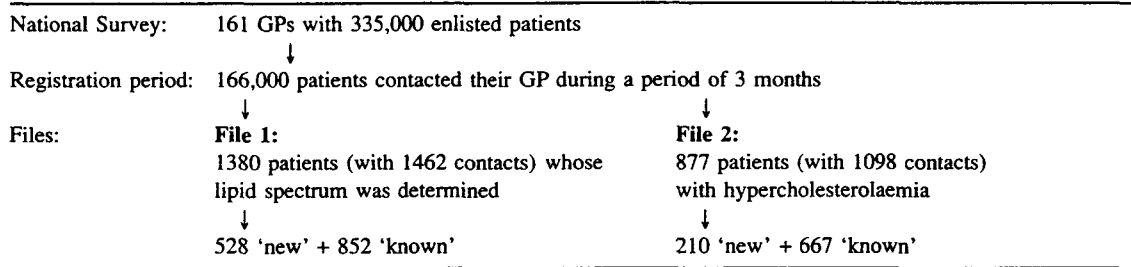
Data recorded include patient characteristics, characteristics of the consultation, reason for consultation, diagnosis, and interventions (diagnostic tests, non-drug and drug treatment, referral). Different health problems presented in one consultation were registered separately. Each health problem contained a maximum of three reasons for consultation, one diagnosis, and two differential diagnoses. Reasons for consultation and diagnoses were coded in ICPC-codes.

The GPs could mark on their registration form that they requested a lipid spectrum, including total cholesterol and/or triglycerides and/or lipoproteins and/or free fatty acids. Checking the laboratory-forms showed that all lipid spectrum applications included at least total cholesterol.

A distinction was made between patients who consulted their GP for the first time in relation to reasons that resulted in a request for a lipid spectrum ('new' patients), and those who had already consulted their GP before the registration-period, with problems related to cholesterol diagnosis or intervention ('known' patients).

To answer the first question all contacts in which a lipid spectrum was determined were se-

Figure 2. The structure of the 2 cholesterol files.



lected (file 1). File 1 consists of 1380 patients (1462 contacts).

Regarding question 2 a second, separate selection was made consisting of:

- all patients of file 1 with hypercholesterolaemia*;
- all patients in whom the ICPC-code lipid metabolism disorder (T93) was registered as reason for consultation or diagnosis;
- all patients for whom a cholesterol-lowering drug was prescribed.

This file 2 includes 877 patients (1098 contacts) with hypercholesterolaemia.

The structure of the files is summarized in Fig. 2.

The amount of inter-doctor variation was studied by means of the coefficient of variation (CV) (12). The CV (dividing the standard deviation by the mean) is a measure for relative variability. To explore the determinants of this variation, multiple linear regression analysis was used. GPs in file 2 who had less than three patient contacts on the subject (n=59) were excluded from this

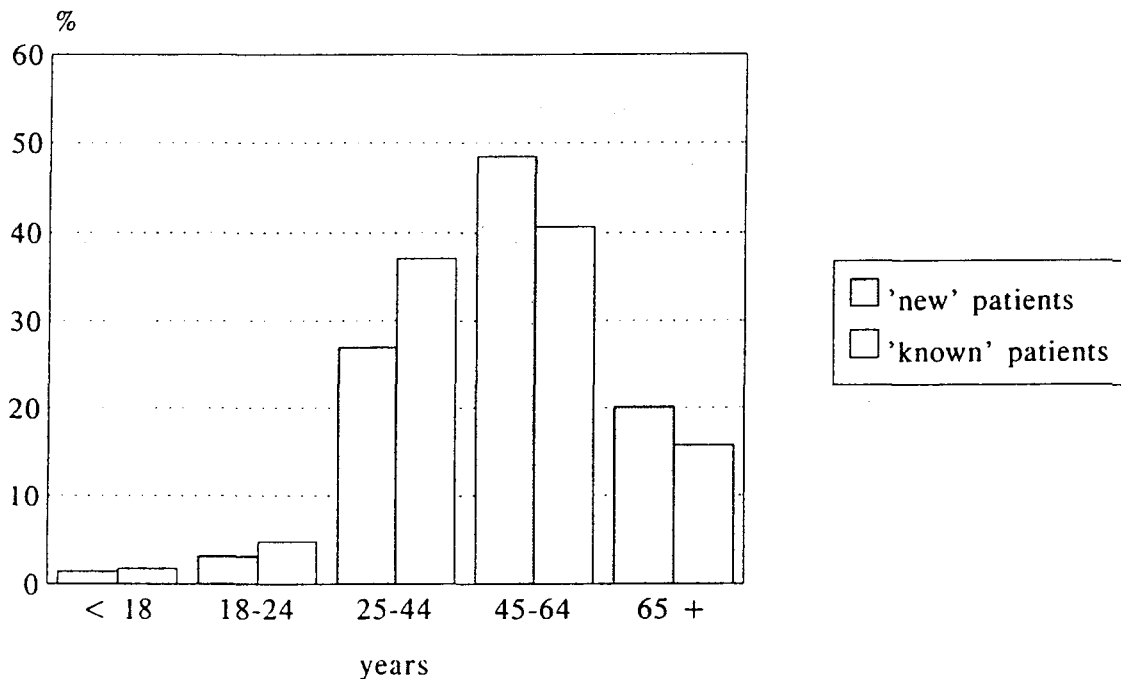


Figure 3. Age-distribution of 'new' and 'known' patients. Percentages.

Table 1. Top 10 reasons for consultation and top 10 diagnoses for patients in whom serum cholesterol was tested (percentages)

'new' patients (n=528)		'known' patients (n=852)	
A. Reason for consultation			
1. General weakness/tiredness	18.6	Blood pressure measurement	20.4
2. Symptoms thorax/rib	8.1	Blood test (metabolism)	8.3
3. Blood pressure measurement	6.6	General weakness/tiredness	6.6
4. Complete medical examination	6.3	Complete medical examination	5.8
5. Blood test (metabolism)	5.5	Partial medical examination (metabolism)	5.4
6. Headache (excl. sinus)	4.5	Lipid metabolism disorder	3.1
7. Symptoms leg/thigh	4.0	Results test/procedures	3.1
8. Vertigo/dizziness	3.6	Observation/health education/diet (metabolism)	2.0
9. palpitations/awareness of heartbeats	3.2	Generalized abdominal pain/cramps	1.8
10. Partial medical exam (metabolism)	3.2	Symptoms leg/thigh	0.9
B. Top 10 diagnoses			
1. Uncomplicated hypertension	6.3	Uncomplicated hypertension	25.0
2. No disease	6.1	Lipid metabolism disorder	15.6
3. Lipid metabolism disorder	5.5	Complete medical examination	4.9
4. Neurasthenia	4.9	No disease	4.7
5. General weakness/tiredness	4.4	Diabetes mellitus	3.5
6. Complete medical examination	3.8	No diagnosis	2.1
7. Feeling anxious/nervous/inadequate	3.0	Feeling anxious/nervous/inadequate	2.0
8. Acute stress/situational disturbance	2.1	Neurasthenia	1.8
9. Diabetes mellitus	2.1	Depressive disorder	1.5
10. Angina pectoris	1.7	General weakness/tiredness	1.3

analysis. Correlation coefficients were calculated to explore substitution between different kinds of therapy.

Results

Diagnostics

A cholesterol test was ordered in 0.8% of all the patients (1380/166,000) who had visited their GP during the registration period of three months.

Demographic characteristics

The patients for whom a lipid spectrum was requested were on average 50 years old. Half the patients were between 45 and 64 years old. The sex distribution of the patients involved was almost symmetrical. According to the guidelines, the age-criteria for screening of cholesterol are

between 18 and 65 years. Of the 'new' patients 21.5% did not meet these age criteria (Fig. 3). This percentage was considerably higher for older women (25.4%) than for older men (17.4%).

Reasons for consultation

The ten reasons for consultation most frequently presented by the patients are listed in Table 1A.

For 'new' patients a lipid spectrum was most frequently – 33.9% of all reasons – indicated on non-specific symptoms such as general weakness/tiredness, headache, vertigo/dizziness, palpitations/awareness of heartbeats. Contacts concerning health check-ups (complete and partial medical examination) accounted for 9.5% of all the reasons for consultations.

Of the 'known' patients the non-specific indications (general weakness/tiredness and generalized abdominal pain/cramps) were of lesser

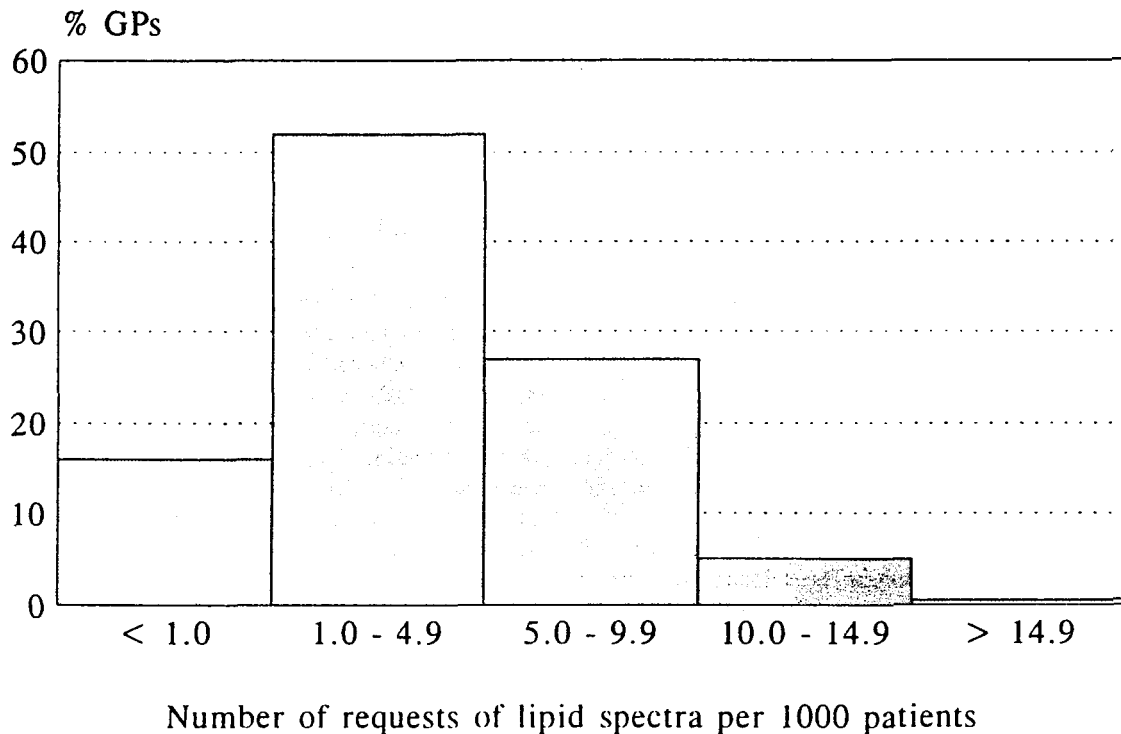


Figure 4. Inter-doctor variation in number of requests of lipid spectra per 1000 patients. Percentage GPs to number of requests per 1000 patients.

magnitude (8.4% of all the reasons for consultations).

Cholesterol measurements in this group of patients were more often indicated in control of hypertension (blood pressure measurement), lipid metabolism disorder, or health-check-ups.

Diagnoses

In 5% of the patients serum cholesterol was determined by more than one measurement during the registration period of three months.

Table IB lists the top 10 diagnoses of 'new' and 'known' patients with the reasons for consultation as mentioned in Table IA. In the first group hypertension, no disease, and lipid metabolism disorder were most common, but did not occur much more than the other diagnoses. The other diagnoses, except diabetes mellitus and angina pectoris, were mainly psychiatric in nature.

In the group of 'known' patients hypertension and lipid metabolism disorder were by far (40.6%) the most common diagnoses.

Inter-doctor variation

The number of requests for lipid spectra varied between the GPs (Fig. 4). Half of the GPs requested 1 to 5 measurements per 1000 patients over

Table II. Linear regression analysis on number of cholesterol requests explained by GP and practice characteristics. Standardized regression coefficients (beta).

	Beta	significance
GP's age	-0.004	0.96
GP's sex (male)	-0.017	0.89
Mean age of patients	0.023	0.79
Percentage women patients	0.022	0.83
Size of practice population	-0.240	0.01
Degree of urbanization	0.091	0.32
Type of practice		
Health centre	0.087	0.31
GP working solo	0.226	0.01

- adjusted R square: 0.07

- the GP with 27.4 requests per 1000 patients was left out in this analysis

the period of three months. The GP with the highest number of measurements requested 27.4 per 1000 enlisted patients. The average was 4.1 lipid spectra per 1000, with a standard deviation of 3.5 (CV = 0.85).

Doctor and practice characteristics were explored to explain this inter-doctor variation (Table II). GPs working solo requested cholesterol tests more often, while GPs with large patient lists requested less often.

Therapy

Non-drug therapy

The GPs advised and/or informed 42% of the patients; 39% of 'known' and 51% of 'new' patients.

Diet therapy was given to 15% of 'known' and 13% of 'new' patients. The GPs referred three percent of the patients to a dietician.

Drug therapy

Cholesterol-lowering drugs were prescribed to 25% of 'known' and 1% of 'new' patients. Table III gives an overview of prescribed drugs. Bile acid binders were prescribed mostly, followed by nicotinic acid, and fibrates. Over 10% of women under the age of 50 were prescribed lipid lowering drugs.

Inter-doctor variation

Inter-doctor variation in therapy was large for the prescription of fibrates (CV = 3.28). There were also variations in the prescription of nicotinic acid (CV = 2.86) and in referral to a dietician (CV = 2.31). Inter-doctor variation in therapy could not be explained by any of the doctor and practice characteristics mentioned in Table II.

No correlation was found between the degree

of prescribing diet and the degree of prescribing cholesterol-lowering drugs ($r = -0.18$, $p > .05$), or other combinations.

Discussion

Methods

In the US and Canada telephone surveys (13-16) and medical chart audits (17-19) were conducted to determine the management of hypercholesterolaemia by GPs. It is quite possible that these research methods yield primarily socially desirable information or expose only part of reality, respectively. Determination of usual care based on intensive consultation registration seems to overcome these shortcomings.

On the other hand, these data give very little insight into the anamnestic part of the consultation, as well as management of Familial Hypercholesterolaemia for which no specific ICDPC-code exists. Cholesterol screening is supposed to be executed in an anticipatory way, by case finding. The trigger for cholesterol screening might be the visit to the GP rather than the patient's reason for that visit. Still, considering the fact that reasons for consultation relating to different health problems were registered separately, as well as the large size of the data set, and the unmistakable indications for screening such as medical examination, conclusions can be drawn from the data.

Unfortunately, the norm for hypercholesterolaemia was not standardized between the different laboratories. Analysis of file 2 does not leave us with hard data but gives a description of management by GPs of the concept of hypercholesterolaemia.

Table III. Drug therapy for men and women pre- and postmenopausal (age criterion 50 years) (percentages)

	♂ n=470	♀ ≤50 n=122	♂ >50 n=285	total n=877
No medication	61	68	44	57
Bile acid binders	4	1	7	5
Fibrates	13	9	16	14
Nicotinic acid	8	3	13	9
Thyroxine	—	1	—	0.1
Cardiovascular medication	13	7	17	13
Other medication	9	16	16	13

Diagnostics

Indications for serum cholesterol measurement in 'new' patients consisted mainly of non-specific symptoms, not valid according to the guidelines. Less than 15% of all the indications were possibly indicated according to the guidelines, i.e. 6.6% concerning blood pressure measurement (possibly hypertension) and 8.1% concerning symptoms of thorax/rib (possibly angina pectoris or more likely fear of cardiovascular disease?).

Serum cholesterol was measured more than once in only five percent of the patients during the three months' period. It seems unlikely that serum cholesterol was measured more than once in the other cases before or after the registration period.

The number of non-specific diagnoses is remarkable, especially in 'new' patients.

Therapy

We do not know what the contents and quality of the advice or information given to the patient were, nor how they were given. Recently a low rate of lifestyle advice in general practice (20) as well as a lack in communication skills regarding hypercholesterolaemia (21) have been reported.

The designers of the guidelines attach great importance to extensive patient information at the moment hypercholesterolaemia is diagnosed for the first time. At the time of the National Survey, patient information was given in only half of those cases. Diet advice was given to only 14% of patients. It is possible that some diet advice was not registered but was given in another consultation outside the registration period. Despite this potential bias it is still a low number considering the fact that diet therapy is, according to the guidelines, the foundation of cholesterol-lowering therapy, deserving attention in every cholesterol-related consultation.

Only three percent of the patients were referred to a dietician during the registration period. It is not known in how many cases diet advice had already been given by a dietician, so there might be underestimation.

Over 10% of pre-menopausal women with hypercholesterolaemia were treated with lipid-lowering drugs. Considering the guideline that Familial Hypercholesterolaemia is the only in-

dication for drug treatment of pre-menopausal women, this is a fairly high percentage. In the years when the 'National Survey' was conducted, the HMG coenzyme-A reductase inhibitors were not on the market. It would be interesting to know how the prescription of cholesterol-lowering drugs has been changed, now that the HMG coenzyme-A reductase inhibitors are available.

No evidence could be found for a substitution-effect between advice or diet therapy and the prescription of drugs.

Conclusion

Managing hypercholesterolaemia was not a clear-cut task for Dutch GPs at the time of the National Survey. The large inter-doctor variation justifies publication of guidelines for cholesterol management in general practice.

Discrepancies between daily practice and the guidelines may point at potential problems with feasibility of the guidelines. Possible barriers to change, which should be taken into account in implementing the Standard, are situated mainly in the field of indications for screening, diagnosis of hypercholesterolaemia, informing the patient when hypercholesterolaemia is diagnosed, and diet therapy as the foundation of cholesterol-lowering treatment. These are quite similar to points of attention recently assessed in the US (22).

Physicians' attitudes and motivation, rather than availability of practice guidelines, seem to relate more to actual preventive performance (23). Further research on the implementation of cholesterol guidelines in general practice is recommended. Much improvement can be achieved in this area.

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