

Cardiovascular health check in the elderly in one general practice: does it offer new information and lead to interventions?

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Background. Prevention of cardiovascular disease in the elderly is becoming increasingly important. GPs are in a unique position to initiate preventive interventions in this age group. However, it is not clear which strategy a GP should follow to identify patients at increased cardiovascular risk—case finding or screening.

Objective. We aimed to assess the value of a single cardiovascular health check compared with a normal care case finding and to investigate the diagnostic or therapeutic consequences of detecting new cardiovascular risk indicators.

Methods. In 1991, 1002 persons aged 60 years and over, enlisted in one general practice, were invited. Of the 805 subjects who responded (80%), the cardiovascular risk profile was determined by a research physician. The proportion of newly detected cardiovascular risk indicators was the main outcome measure. A risk indicator was considered newly detected when it was not mentioned in the GP's summary of the patient record, which had been checked by the patient for its completeness. The patient records of participants with newly detected hypertension, diabetes or hypercholesterolaemia were systematically reviewed to detect diagnostic and therapeutic interventions by the GP.

Results. In 25.1% of the participants, one or more cardiovascular risk indicators were found which were previously unknown to the GP, including 38 (4.7%) cases of hypertension, 82 (10%) cases of isolated systolic hypertension, 14 (1.7%) cases of diabetes mellitus and 63 (7.8%) cases of hypercholesterolaemia. On the basis of these findings, the GP initiated therapeutic interventions in almost all subjects with newly detected diabetes. However, reports of newly detected hypertension or high cholesterol levels were usually not followed by an intervention.

Conclusion. A single cardiovascular health check in the elderly can detect a considerable number of risk indicators that are unknown to a patient's GP. In most cases, however, the detection of hypertension or cholesterol ≥ 6.5 mmol/l did not lead to interventions by the GP. More efforts are needed to ensure that the beneficial effects of these interventions are not limited to participants in clinical trials but can be extended to patients in general practice.

Keywords. Aged, cardiovascular disease/prevention and control, family practice.

Introduction

Cardiovascular disease is a major cause of death and disability in developed countries. Nowadays, an increasing number of persons suffer from cardiovascular

disease, mainly owing to reduced case fatality after myocardial infarction and the rapidly growing number of elderly. Primary and secondary prevention of cardiovascular disease focusing on the elderly will become increasingly important.¹

Elderly men and women have a high absolute risk of cardiovascular events,^{2,3} and thus are liable to profit from interventions targeted at improvement of their cardiovascular risk profile. This is illustrated by the impressive results of trials on the treatment of hypertension in the elderly.^{4,5} However, these data do not necessarily translate to treatment in clinical practice.

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There is confusion over the role and type of screening in general practice to detect patients with unfavourable cardiovascular risk profiles. GPs in the UK are obliged to perform a 3-yearly cursory health check in adults, and to offer an annual comprehensive health check to those aged 75 years and over. Patients can be invited for this health check opportunistically as well as systematically. The cost-effectiveness of this general screening, including screening for cardiovascular risk factors, is still under debate.⁶⁻⁹

In contrast, in The Netherlands cardiovascular screening is restricted to opportunistically measuring the blood pressure or cholesterol level in patients with a high risk of cardiovascular disease. This approach will disregard those who are not in the target group but who may profit from anti-hypertensive treatment or cholesterol lowering. Furthermore, the high workload in general practice may hinder opportunistic screening.¹⁰

Few studies have compared the relative merits of systematic and opportunistic cardiovascular screening in older adults. Holmen *et al.* found that Norwegian GPs can detect and diagnose hypertension equally well with opportunistic screening and systematic screening.¹¹ On the other hand, McMennamin reported that in New Zealand, where opportunistic screening is advocated, offering a health check gave sufficient new findings to justify this effort.¹² Thus, it remains unclear which strategy a GP should choose to detect patients prone to develop cardiovascular disease.

The present study adds to this debate by examining the value of a systematically offered cardiovascular health check in one general practice in The Netherlands where selective opportunistic screening is advocated. We investigated the number of previously unknown cardiovascular risk indicators that could be detected by a single cardiovascular health check of patients aged 60 years and over. It was also determined whether knowledge on some of these previously undetected risk factors led to further diagnostic or therapeutic interventions by the GP.

Subjects and methods

The study was performed in one general practice in Krimpen aan den IJssel, a suburban town near Rotterdam, from January 1991 until January 1992; three GPs share the practice facilities. The GPs use computerized patient records as the main source of information about the health of their patients. All medical data, including consultations, prescriptions, laboratory results and summaries of letters from specialists, is recorded in the computerized patient file.

A previous study showed that the computerized patient files were accurate in identifying 84% of all medication use.¹⁶

All persons aged 60 years and over registered with this general practice received a letter from their GP, offering

a single cardiovascular health check. This was followed by a telephone call from the research physician to arrange the health check. Those with dementia ($n = 20$) or with a severe disabling illness (e.g. terminal malignancies), according to the GP ($n = 80$), did not receive an invitation. Participants of the pilot study ($n = 30$) were also excluded.

A research physician performed the cardiovascular health check. First, the summary of the patient's medical history which was made by the GP and recorded in the computerized patient file was checked by the participant for its completeness. For example, if the GP had not included hypertension in the summary and the participant reported the use of anti-hypertensive medication, hypertension was added to the summary. Similarly, hypercholesterolaemia or diabetes mellitus could be added as a result of discussing the summary with the participant. Secondly, the health check consisted of a structured questionnaire and a physical examination. The questionnaire enquired about cardiovascular symptoms, diseases and family history, smoking and drinking habits, and current medication use. The physical examination consisted of auscultation of heart, major vessels and lungs, evaluation of peripheral pulsations and oedema, and palpation of the abdomen. In addition, blood pressure, glucose and cholesterol levels, heart rate, height and weight were measured.

Blood pressure was measured in sitting position with a standard desktop mercury sphygmomanometer; the mean of two readings with a 1-minute interval was determined. Hypertension was diagnosed in accordance with the Dutch College of General Practice guidelines.¹³ In participants with a diastolic blood pressure of ≥ 95 mm Hg, or a systolic blood pressure of ≥ 160 mm Hg, two more sets of blood pressure values were obtained within the following 4-8 weeks. If the mean diastolic blood pressure of these sets was on average between 95 and 104 mm Hg, another two sets of measurements were obtained in the subsequent 4-8 weeks. For these latter participants the mean of all five sets was taken as the blood pressure. Hypertension was defined as a mean diastolic blood pressure ≥ 95 mm Hg, and isolated systolic hypertension as a mean systolic blood pressure ≥ 160 mm Hg with a mean diastolic blood pressure < 95 mm Hg.

Non-fasting capillary glucose levels were assessed by means of the Glucometer Gx (Ames). If a capillary glucose of 10 mmol/l or higher was measured, a venous fasting sample was obtained. Diabetes mellitus was defined as a fasting sample above 6.7 mmol/l.¹⁴ The cholesterol level was determined only in participants with known hypertension, diabetes mellitus or hypercholesterolaemia, as recommended by the Dutch College of General Practice guidelines.¹⁵ This was performed by a regional laboratory using standardized techniques. In the present study, a single total cholesterol level of 6.5 mmol/l or higher was required to diagnose hypercholesterolaemia. The Body Mass Index was

TABLE 1 Prevalence (%) of cardiovascular risk indicators during a single cardiovascular screening examination of 805 persons ≥ 60 years of age in one general practice (n = number of patients)

Cardiovascular risk indicator	Men $n = 379$	Women $n = 426$	60–69 years $n = 526$	>70 years $n = 279$	total $n = 805$
Hypertension	25.7	33.4	27.6	33.8	29.8
Isolated systolic hypertension	9.0	11.3	6.9	16.6	10.2
Diabetes mellitus	6.6	8.0	4.6	12.5	7.3
Cholesterol ≥ 6.5 mmol/l	22.2	29.1	30.2	17.6	25.8
Current cigarette smoking	31.5	12.5	24.1	16.5	21.4
Body Mass Index ≥ 30 kg/m ²	6.6	15.3	10.1	13.3	11.2
Family history of cardiovascular disease	19.6	21.8	22.4	17.6	20.7
Angina pectoris	11.4	11.5	8.0	17.9	11.4
Intermittent claudication	5.3	1.6	2.9	4.3	3.4
History of myocardial infarction	12.1	5.9	6.7	12.9	8.8
History of transient ischaemic attack	5.3	3.1	3.4	5.4	4.1
History of stroke	1.3	0.9	0.8	1.8	1.1

calculated and a cut-off point of 30 kg/m² was used to define obesity.

For each participant, the presence of the following risk indicators were recorded: hypertension, diabetes mellitus, hypercholesterolaemia, smoking, obesity, a history of coronary heart disease in a first degree relative, angina pectoris, intermittent claudication and a history of myocardial infarction, transient ischaemic attack or stroke.

After the cardiovascular health check, a specially trained practice assistant and the research physician entered the risk indicators found at the health check for each participant in the patient's computerized medical record at the general practice office. We compared the cardiovascular risk indicators found at the health check with those mentioned in the summary of the patient's medical history in the computerized patient files. Each risk indicator which had been detected at the health check but was not mentioned in the summary was defined as newly found during the health check.

In 1996 we systematically reviewed the patient records of all participants ($n = 110$) who, during the cardiovascular health check in 1991–1992, had been newly diagnosed with hypertension, diabetes or hypercholesterolaemia, to assess whether diagnostic and therapeutic interventions were initiated within 1 year after the cardiovascular health check. Repeated measurements of blood pressure, glucose or total cholesterol levels in cases where one of these parameters was elevated during the cardiovascular screening examination were considered diagnostic interventions. Therapeutic interventions were defined as the prescription of anti-hypertensive, anti-diabetic or lipid-lowering drugs. Since all participants with hypertension or hypercholesterolaemia had been given dietary advice by the research physician,

this was not considered a therapeutic intervention initiated by the GP. Dietary advice in diabetes mellitus, however, was defined as a task of the GP. Therefore, dietary advice recorded in the patient file of a newly detected diabetic patient was considered a therapeutic intervention by the GP.

DBase and the Statistical Package for the Social Sciences (SPSS) were used to store and analyse data.

Results

Of the 1132 registered persons aged 60 years or older, 1002 were invited systematically. In total, 805 subjects participated, giving a response rate of 80.3%. Non-responders ($n = 197$) did not differ from responders in age and gender but were less likely to be insured solely by the National Health Service, which indicates a higher social economic status. Most health checks (91%) were performed at the GP's office, and some were at the patient's home ($n = 35$) or nursing home ($n = 39$).

The prevalence of cardiovascular risk indicators was considerable in this older population. In 32% of the 805 participants, one risk indicator was observed, in 27% two risk indicators, in 17% three risk indicators, and in 11% four or more risk indicators. Only 13% of the participants were free from any of the cardiovascular risk indicators included in the risk profile. Table 1 shows the cardiovascular risk profile of the participants, according to gender and age.

Risk indicators previously unknown to the GP were found in 25.1% of the participants (Fig. 1), including 38 (4.7%) cases of hypertension, 82 (10%) cases of isolated systolic hypertension, 14 (1.7%) cases of diabetes

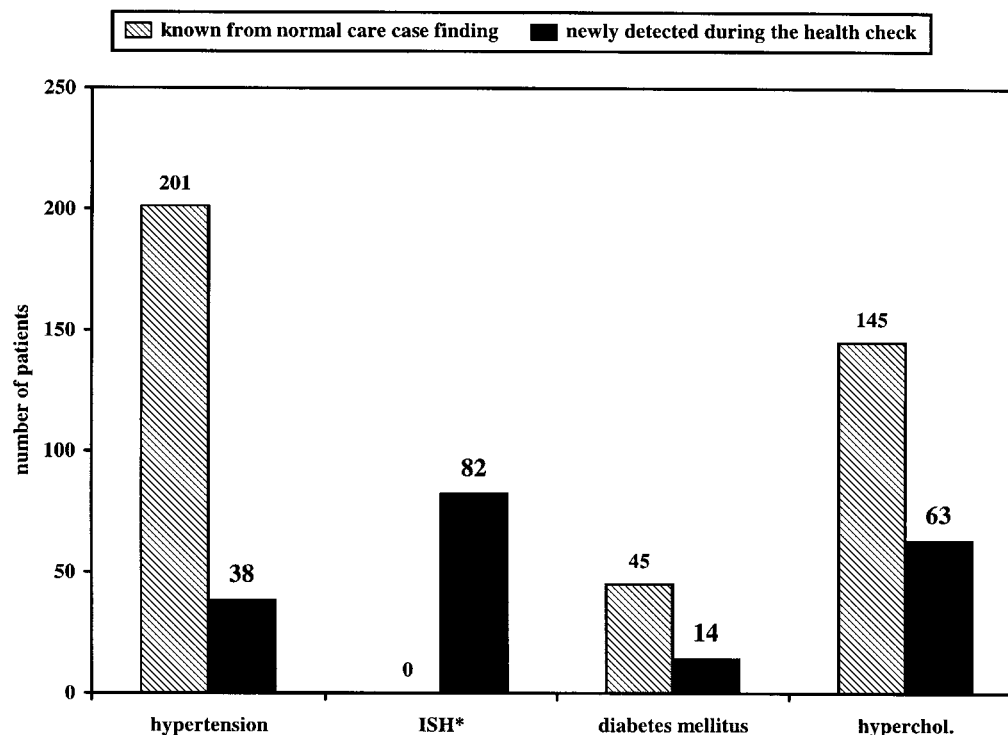


FIGURE 1 Prevalence of cardiovascular risk indicators known from the GP's normal care case finding and newly detected risk indicators during a single health check in 805 participants

* No diagnoses of isolated systolic hypertension (ISH) were included in the GP's summary of the patient's medical history.

mellitus and 63 (7.8%) cases of hypercholesterolaemia. Furthermore, 8 (1%) participants suffered from angina pectoris and 10 (1.3%) from intermittent claudication, while these complaints were not known to their GP. In addition, the summary of the participants' medical history contained no information on cigarette smoking ($n = 172$), family history of cardiovascular disease ($n = 166$) or obesity ($n = 89$). If these three latter risk indicators are taken in account, 59% of all participants had at least one risk indicator which was not recorded in the summary of their patient medical history.

For almost all participants with newly diagnosed diabetes mellitus, the GPs gave dietary advice ($n = 4$) or started medication ($n = 3$) (Table 2). These diabetic patients had no complaints of diabetes mellitus recorded in their patient file, and treatment was started only

because of the repeatedly elevated glucose levels found at the health check. Of 25 patients with previously unknown hypertension, treatment was initiated in six participants only, while further diagnostic measurements of the blood pressure took place in as few as five cases. The GPs hesitated to manage actively hypercholesterolaemia. The cholesterol level was measured again within 1 year in 11 of 48 participants with a single cholesterol measurement above 6.5 mmol/l, while in one patient, lipid-lowering medication was prescribed.

Discussion

Screening for cardiovascular risk indicators aims to detect subjects with unfavourable risk profiles and to

TABLE 2 Number of interventions within 1 year after hypertension, diabetes mellitus or hypercholesterolaemia was detected during a single cardiovascular health check

Cardiovascular risk indicator	No. of cases detected	Diagnostic interventions (%)	Therapeutic interventions (%)	No interventions (%)
Hypertension	25	5 (20)	6 (24)	14 (56)
Diabetes mellitus	8	0 (0)	7 (88)	1 (13)
Cholesterol ≥ 6.5 mmol/l	48	11 (23)	1 (2)	36 (75)

prevent the occurrence of coronary heart disease or stroke. This may be even more relevant in the elderly, who are at an increased risk of such events. During a cardiovascular health check of 805 men and women aged 60 years and over, in 25.1% of the participants we found cardiovascular risk indicators that were previously undetected by the GP. Although detection of diabetes almost always led to therapeutic actions by the GP, previously unknown hypertension and elevated cholesterol levels did not initiate diagnostic or therapeutic interventions in the majority of cases.

A health check in all subjects enlisted in a general practice is not the advocated method in The Netherlands for detecting unfavourable cardiovascular risk profiles. Rather, the Dutch College of General Practitioners' guidelines recommend that GPs actively screen for hypertension or hypercholesterolaemia only when they are consulted by patients with at least one other cardiovascular risk indicator. As indicators tend to cluster and because their harmful impact increases exponentially when other risk indicators are present, this case finding of high-risk patients is considered to be cost-effective. However, as our study shows, this advantage must be balanced against the disadvantage of having incomplete information on the presence of modifiable cardiovascular risk indicators in a large proportion of the elderly in general practice.

This study has a number of limitations. First, it is obvious that the end-point chosen in this study, i.e. the number of newly detected risk indicators, depends on pre-existent efforts and interests of the GPs in preventive cardiology. With only three GPs from one practice participating in this study, a higher than average interest of the GPs in preventive cardiology could lead to a smaller number of newly detected cardiovascular risk indicators. Clearly, one should be cautious in generalizing our results. Another limitation is that the study was conducted in 1991–1992; although no new Dutch guidelines on preventive cardiology were published since 1991, new reports on the therapy of isolated systolic hypertension and hypercholesterolaemia have led to more active intervention policies being advocated.^{4,5,17,18}

The lack of diagnostic or therapeutic actions of the GPs following a single increased cholesterol level in our study is understandable. The efficacy of lipid lowering in the elderly was debated during the time our study was performed.^{15,19} However, more recent studies suggest that treatment is effective for ages up to 64 years in patients without myocardial infarction and for ages up to 70 years in patients with myocardial infarction.^{17,18}

In our elderly study groups, hypertensives were not always treated. This finding concurs with other reports, indicating that GPs are hesitant to treat hypertension in the elderly and only do so if blood pressure values are significantly higher than the cut-off value for treatment advised in the guidelines and used in the present study.^{20–22} Nevertheless, the evidence provided by the recent trials

on the favourable effect of treating hypertension and isolated systolic hypertension in the elderly will probably reduce the proportion of untreated elderly hypertensive patients.²³

Although a recent report suggested an increase in case finding for diabetes mellitus by Dutch GPs in the last decade, 1% of patients in our study still had undetected diabetes.²⁴ Fortunately, the GP initiated treatment in almost all cases.

Large studies comparing the effectiveness of selective opportunistic screening and more extensive systematic screening for cardiovascular risk indicators in the elderly are scarce.^{11,12} The OXCHECK and the British Family Heart study, which included younger participants up to 64 and 59 years, respectively, showed only modest effect of systematic screening and subsequent intervention on cardiovascular risk indicators. Their results add to the debate on whether the costs of cardiovascular health checks on such a large scale can be justified in view of other healthcare expenditures.^{7,25,26} Calculations based on the OXCHECK findings and the Framingham data showed a greater cost-effectiveness of more selective forms of screening, such as a strategy targeted at hypertensive men in their seventh decade of life.²⁷

We conclude that a single cardiovascular health check in the elderly may identify high levels of risk indicators which are not recorded in the patient file. In the general practice setting of the present study, these risk indicators were not detected by the normal care-selective opportunistic screening. These gains should be balanced against the costs of this health check, which amount to £30 per participant. Furthermore, the lack of interventions in elderly hypertensive and hypercholesterolaemic patients indicates that more effort is needed to ensure that the beneficial effects following risk-factor intervention are not limited to participants in clinical trials but can be extended to patients in general practice.

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