

# Hypertension management in primary care: standard care and attitude towards a disease management model

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## ABSTRACT

**Introduction:** Cardiovascular risk control has become one of the hallmarks in the treatment of diabetes and coronary heart disease, yet assessment of individual risk factors is suboptimal. We have designed a new Hypertension Screening Facility (HSF) for the evaluation of cardiovascular risk in hypertensive patients, based on 1) systematic, protocol-driven (WHO/ISH-based) analysis by nurse practitioners, 2) computer-assisted reporting of results and advice, 3) risk assessment using a Decision Support System (DSS), 4) maintenance of the autonomy of the GP. In a pilot study we wanted to investigate this HSF.

**Methods:** Survey 1 addressed a. how general practitioners deal with hypertension, b. whether they intend to and do use existing clinical guidelines, c. what their opinions are towards changes in the current process of care. In survey 2, we evaluated the attitude of GPs using the HSF. Responses were 43% (51 out of 120) to the first survey and 100% (20 out of 20) to the second.

**Results:** The majority of physicians included lifestyle in their assessment of risk factors and management of hypertension. Consideration of age and a positive family history was extremely high. In contrast, vision disturbances, ECG and microalbuminuria were not often considered. In the absence of additional risk factors, drug treatment was initiated in patients with a mean systolic blood pressure of  $162 \pm 6$  over  $99 \pm 4$  mmHg. In the presence of risk factors (obesity, smoking and a positive family history of cardiovascular disease) treatment is started at an average blood pressure of  $154 \pm 8$  over  $96 \pm 4$  mmHg. Opinions towards a change in management of hypertensive patients were generally positive. The opinions about the new HSF and the cardiovascular risk were reported to the general

practitioner and considered useful or very useful by 79%. **Conclusion:** The present study thus confirms that cardiovascular risk evaluation by GPs is suboptimal, but there is a positive attitude towards an improvement in their assessment by HSF. The novelty of the HSF is that it respects the autonomy of the GP and brings the expertise to the GP.

## INTRODUCTION

Cardiovascular risk control has become one of the hallmarks in the treatment of diabetes and coronary heart disease, yet assessment of individual risk factors is suboptimal. As illustrated by a population study in the Netherlands, the 'rule-of-halves'<sup>1</sup> is still applicable to the treatment of hypertension.<sup>2,3</sup> International and national protocols are available for the evaluation and treatment of hypertension, and the assessment of comorbidity.<sup>4,7</sup> These protocols and the availability of efficient drugs are in contrast with the insufficient control of hypertension.<sup>8-12</sup> At first glance hypertension management protocols such as provided by the World Health Organisation (WHO) seem straightforward.<sup>4</sup> Nevertheless, in many countries, physicians are primarily involved in curing rather than preventing disease and preventive work therefore requires reorganisation of medical practice.<sup>13-15</sup> Furthermore, it could be argued that the information the general practitioner (GP) needs to deal with is too complex, changes too quickly and imposes too great a workload. A potential solution to deal with protocols to manage hypertension and prevent cardio-

vascular disease in a detailed manner is the application of a Hypertension Screening Facility (HSF).<sup>16-18</sup> This concept supplies systematic assessment and management of hypertensive patients according to guidelines and yields complete assessment of coexisting cardiovascular risk factors and advice for the general practitioner.<sup>19</sup> A computer-based decision support system (DSS) has been shown to further improve the quality of antihypertensive treatment.<sup>20,21</sup> We designed a new strategy for the identification and evaluation of cardiovascular risk factors in hypertensive patients and have implemented it in our clinic since 1997. The strategy is based on 1) a systematic, protocol-driven (WHO/ISH-based) analysis by nurse practitioners, 2) computer-assisted fast reporting of results and advice, 3) risk assessment using a DSS and 4) maintenance of the autonomy of the GP. Here, we report on two surveys. The first addressed the question how general practitioners judge their own management of hypertension, whether they intend to and do use existing clinical guidelines, and what their opinions are towards assistance in the current process of care. The second evaluated the attitude of GPs using the HSF.

## METHODS

### Survey 1: Current hypertension management and cardiovascular risk assessment by GPs

For the first study, data were obtained by sending a questionnaire to 120 general practitioners in the second half of 1999. All physicians worked in the close vicinity of the HSF. The physicians received a covering letter explaining that in the region a new disease management strategy was being developed for hypertension.

The questionnaire consisted of 31 questions, concerning the assessment of hypertension and risk factors, and drug treatment. Furthermore, the GPs were asked for their opinions on the disease management model. The questions about assessment of hypertension, risk factors and target organ damage closely followed the issues addressed in the WHO-ISH.<sup>4</sup> The questions are listed in the on-line table ([www.nephrogenomics.net/data/appendices](http://www.nephrogenomics.net/data/appendices)). The general practitioners were asked to estimate how frequently they closely adhered to the protocols as supplied by the Dutch College of General Practitioners. Regarding drug treatment, preferences for particular groups of drugs were assessed in general, and related to two hypertensive states: essential hypertension without risk factors and essential hypertension with three risk factors (obesity, positive family history of cardiovascular disease and smoking). The physicians received a brief description of the new HSF, and they were asked how frequently they would use the HSF and what they expected from the facility.

### Risk assessment using an HSF

In December 2000 the facilities of our HSF were made available to 20 general practitioners. Hypertensive patients of these physicians could attend the facility for a complete assessment of the history, including assessment of cardiovascular risk factors and symptoms of target organ damage. A complete physical examination was performed, including clinic blood pressure, 24-hour ambulant blood pressure measurement and electrocardiogram (ECG), blood sampling for routine chemistry and risk factor determination. Furthermore, creatinine clearance and microalbuminuria were measured. Cardiovascular risk was estimated based on WHO guidelines<sup>4</sup> and using a DSS. The DSS consisted of a set of rules formulated in Visual Basic (see online appendix at [www.nephrogenomics.net/data/appendices](http://www.nephrogenomics.net/data/appendices)). The data needed to classify the patient were extracted from the HSF database. Primary and secondary prevention strategies for the patient are formulated by the nurse practitioner and checked by a hypertension specialist. Test results, cardiovascular risk estimation and prevention strategies were reported to the GP, who decides on the (non)pharmacological treatment and continues follow-up of the patient.

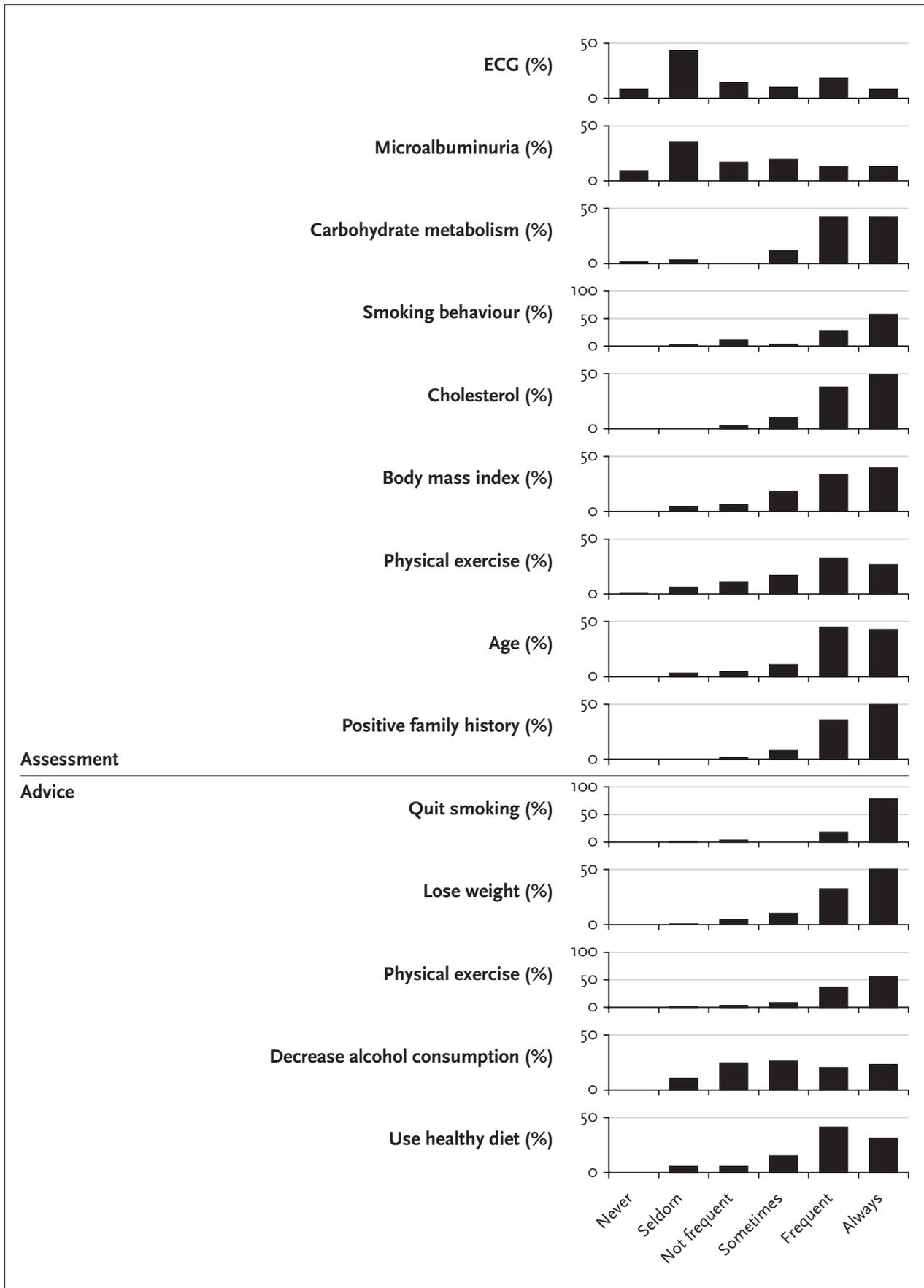
### Survey 2: Opinions about the HSF

In our second survey we assessed the opinion of GPs after using the HSF for almost a year. Data were obtained by sending a questionnaire to the 20 general practitioners. The questionnaire consisted of 20 questions concerning attainability and service of the HSF, indications for using it, opinions about usefulness of different aspects of the analysis and whether the GP agreed with the advice given and implemented the suggested treatment.

## RESULTS

### Survey 1: Hypertension and cardiovascular risk assessment

The response was 43%. Characteristics of the respondents are summarised in *table 1*. *Table 2* lists the general aspects of hypertension assessment. Of the physicians who responded, 80% said they used the guidelines of the Dutch College of General Practitioners. The majority of physicians included lifestyle in their assessment of risk factors and management of hypertension (*figure 1*). Consideration of age and a positive family history was extremely high. In contrast, vision disturbances, ECG and microalbuminuria were not often considered in the assessment of a hypertensive patient. Most physicians answered that they were more aggressive in their approach if one or more risk factors were present. No correlation could be demonstrated, however, between the frequency of assessing risk factors and end-organ damage for each GP and the level of blood pressure where therapy was initiated by that GP.



**Figure 1**  
*Risk factors and target organ damage and nonpharmacological intervention*

**Table 1**  
*Characteristics of the respondents*

Sent questionnaires		120
No. respondents		51
Age (years)	30-40	16
	40-50	47
	50-60	34
	>60	4
Form of practice	Single GP	51
	Two GPs	29
	Group	20
Supporting workers present	Physical therapy	14
	Dietician	10
	Social worker	8

Data shown as percentage of respondents.

**Table 2**  
*Assessment of hypertension*

% of patients in whom blood pressure is assessed <sup>1</sup>	33
Person who measured blood pressure	
Physician	86
Assistant	12
Nonresponders	2
Means of measurement	
Mercury system	41
Different manual	55
Automatic device	2
Nonresponders	2
No. measurements before starting treatment	
2	8
3	69
4	14
>4	2
Nonresponders	2
Time interval between measurements	
1 week	8
2 weeks	63
4 weeks	14
> 4 weeks	8
Nonresponders	2
Adherence to protocol for the assessment of hypertension <sup>2</sup> (median)	80

<sup>1</sup>Median percentage of patients that visit. The other data shown are percentages of respondents. <sup>2</sup>The protocol advises measuring blood pressure on at least three occasions (excluding the first measurement) in a period of several weeks to several months, depending on the blood pressure level.

When one antihypertensive drug was used, there was a preference for  $\beta$ -blockers, ACE inhibitors and diuretics (in that order), while angiotensin-receptor blockers (AT<sub>1</sub> blockers), calcium antagonists and  $\alpha$ -blockers were infrequently chosen. When two drugs were applied, diuretics were frequently combined with  $\beta$ -blockers or ACE inhibitors. Other combinations were less popular. Data on drug treatment are summarised in figures 2 and 3. In the absence of additional risk factors, drug treatment is initiated in patients with a mean systolic blood pressure

(SBP) of  $162 \pm 6$  mmHg or diastolic blood pressure (DBP) of  $99 \pm 4$  mmHg. In the case of a 45-year-old obese, smoking patient with a family history of cardiovascular disease, drug treatment is instituted at an average SBP of  $154 \pm 8$  mmHg and DBP of  $96 \pm 4$  mmHg. The physicians preferred  $\beta$ -blockers, ACE inhibitors and diuretics as the drug of choice for treatment of patients without risk factors for cardiovascular disease (figure 2). ACE inhibitors,  $\beta$ -blockers and diuretics (in that order) were preferred for high-risk patients (figure 3). The majority of GPs replied that they used the guidelines of the Dutch College of General Practitioners frequently (29%), very frequently (29%) or always (8%).

### Survey 1: Attitudes towards a change in hypertension management

The last questions in the questionnaire addressed the opinions of the GPs regarding using a new HSF. Of the physicians, 8% answered that they would always use the facility, 43% often and 24% sometimes. In contrast, less GPs answered that would seldom (10%), hardly ever (12%) or never (4%) use a hospital outpatient HSF. The completeness of the assessment would be a main reason for the use of such an HSF, while time constraints were less important.

### Survey 2: Opinions about risk assessment using an HSF

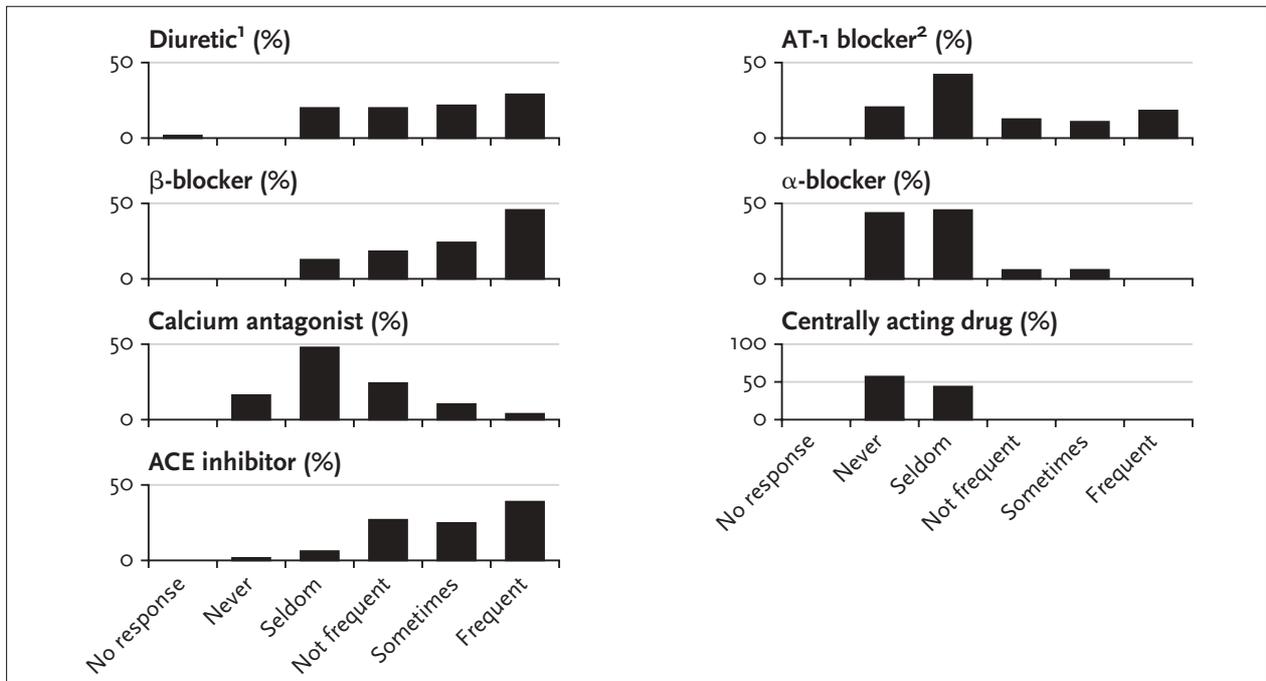
The response to this questionnaire was 100%. All physicians had used the HSF for one or more of their patients. A majority of these physicians indicated that they used the facility for patients with inadequately controlled blood pressure (table 3). The other reasons for the use of the HSF were analysis of newly diagnosed hypertensive patients, young patients, and patients who were suspected of having secondary hypertension.

**Table 3**  
*Main reasons for using the Hypertension Screening Facility*

Inadequately controlled blood pressure	93%
Assessment of newly diagnosed hypertension	43%
Young patients or possible secondary cause of hypertension	36%

Percentage of physicians (n=20) stating they used the facility for the reasons mentioned.

Results of the investigations to determine cardiovascular risk were reported to the GP and considered useful or very useful by 79%. Of the GPs, 93% reported the assessment of target organ damage as being useful or very useful and 86% rated the analysis of secondary hypertension as useful or very useful. The advice on antihypertensive medication,



**Figure 2**

*Drug therapy: monotherapy*

<sup>1</sup>The guidelines of the Dutch College of General Practitioners list thiazides as first choice, except in case of diabetes with microalbuminuria (ACE inhibitor) and coronary artery disease (β-blocker). <sup>2</sup>It should be noted that the guideline does not mention the use of AT-1 blockers. Data shown as percentage of respondents who state they use a particular drug (or combination).

including first-line drug treatment choice and dosage, was rated as useful by 64% of respondents and as very useful by 29%. The analysis of the HSF also summarises contra-indicated medication, which was considered useful in 71% and very useful in 14% of respondents.

In total 86% of the GPs followed the advice of the HSF on management of the patient most of the time, while 14% always followed the advice. Of the respondents, 29% reported that using the HSF was less time consuming, 36% noted no difference and 21% reported that it was more time consuming. Quality of patient care improved with use of the HSF according to the judgement of 86% of the GPs and 93% intended to use the facility in the future.

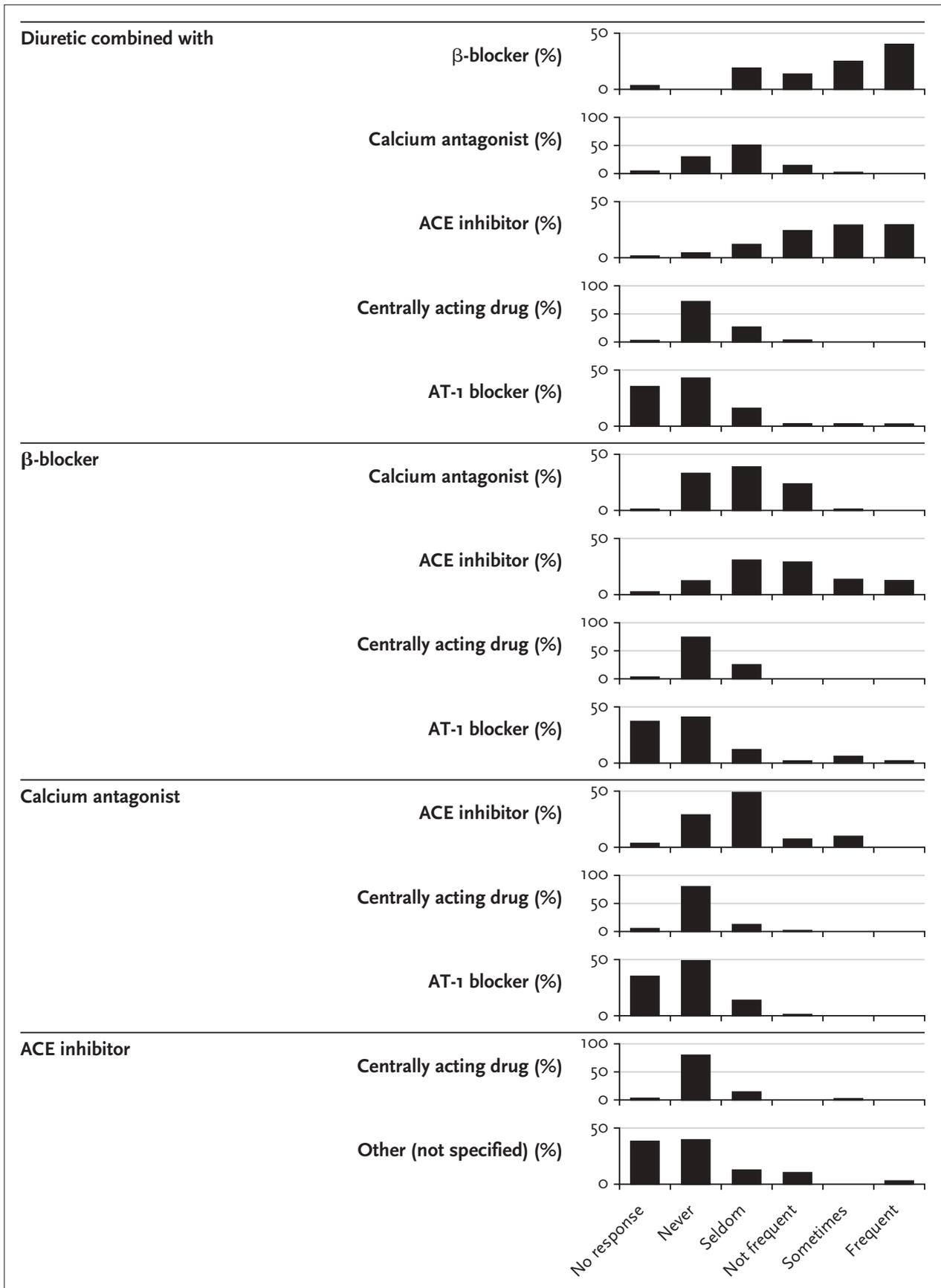
**DISCUSSION**

Standard preventive care concerning cardiovascular disease in the Netherlands is mainly supplied by GPs. The present study assessed how GPs judge their own management of hypertension, whether they intend to and do use existing clinical guidelines, and what their opinions are towards assistance in the current process of care. Furthermore, the attitudes of GPs using the HSF were evaluated. Despite the fact that most of the responders answered positively to the question whether they followed the guidelines, separate aspects of the analysis revealed otherwise. In particular,

target organ damage was not completely routinely assessed. Although blood pressure levels at which hypertension treatment was initiated varied widely, levels were close to the levels in the guideline provided by the Dutch Association of General Practitioners. The GPs were willing to apply a screening by an HSF, and the facility was judged positively after it was implemented.

The average blood pressure thresholds these GPs used to initiate pharmacotherapy were slightly lower than the thresholds recommended by the Dutch College of General Practitioners (SBP 180 mmHg and DBP 105 mmHg in the absence of risk factors). However, these values largely exceed the levels recommended in the guidelines of the WHO, the Joint National Committee guidelines and the European Hypertension Society.<sup>4,5,22</sup> Considering treatment, there was a preference for β-blockers, ACE inhibitors or diuretics. When two drugs were applied, diuretics were preferentially combined with β-blockers and ACE inhibitors. Most GPs preferred to prescribe β-blockers and ACE inhibitors instead of diuretics, recommended as first choice by the Dutch College of General Practitioners.

Cardiovascular risk factors and lifestyle were assessed by almost all GPs. However, target organ damage was mostly not considered; in particular, microalbuminuria, ECG and other indicators of target-organ damage were not assessed. These results support the view that classical disease management may underestimate the overall cardiovascular risk



**Figure 3**  
*Drug therapy: duotherapy*  
Data shown as percentage of respondents who state they use a particular drug (or combination).

of patients presenting with hypertension and stress the importance of improving disease management. Also other studies have shown there is an underestimation of risk and considerable room for improvement of primary and secondary prevention.<sup>15,23</sup>

In our study 80% of GPs stated to work according to the guidelines of the Dutch College of General Practitioners concerning the *assessment* of hypertension; however, only 66% of the physicians report using the clinical guidelines concerning hypertension *treatment*. This means that a significant proportion of GPs have not implemented the guideline of the Dutch College of General Practitioners. Although a majority of the GPs intended to work following guidelines, adherence appeared doubtful.<sup>10,24,25</sup>

The question arises why guidelines are so hard to follow in practice. Other research has focused on whether a change in a guideline was indeed followed by a response of GPs to implementations in their medical assessment and treatment.<sup>26-31</sup> Many reasons can be envisioned. Some of the obstacles to following guidelines are related to the physician himself and to the organisation of primary care: high workload,<sup>28</sup> dated knowledge on cardiovascular risk assessment,<sup>28</sup> availability of laboratory tests and ECG equipment and interpretation. Whereas guidelines may seem obvious, they contain many items that can not be easily dealt with in the speed of practice. A reflection of this is found in the most prominent response to the question why the HSF would be used: completeness of the screening. The present approach using the HSF assists in such complete analyses, without referral to a hospital, which may have negative side effects for the patient. Our study underlines that GPs prefer to treat their own hypertensive patients and refer patients mainly for additional diagnostic procedures or pharmacotherapeutic advice. The majority of hypertensive patients were referred to an internist when the GP suspected secondary hypertension, target organ damage or when there was refractory hypertension. Most of the GPs do not refer with the goal of leaving treatment to the internist. Leaving intact the autonomy of the treatment by the GP has been recognised as an important issue for GPs in other settings, in particular the introduction of evidence-based medicine guidelines.<sup>32</sup> Of the GPs, 75% stated that they would use an outpatient HSF particularly to obtain a more complete assessment of cardiovascular risk in the hypertensive patient. The opinions towards changes in the current design of care of hypertension were positive.

As assessed by the second survey, the alternative approach of hypertension management was readily accepted by a subgroup of GPs in the region who had been using the HSF. Furthermore, the survey shows that the assessment of their patients by the HSF was considered useful. Of the physicians 86% reported that quality of patient care had improved. Hopefully this new method of disease management

will lead to an improvement of objective risk calculation and a reduction in undertreatment of the different risk factors for cardiovascular disease in primary care patients. One of the hallmarks of the current approach is that the HSF provides a systematic assessment of cardiovascular risk and gives (pharmaco)therapeutic advice. Importantly, the unit does not initiate the therapy. In conclusion, the present study confirms that cardiovascular risk evaluation by GPs is suboptimal. It also demonstrates that the attitude of GPs to improve their assessment by using an HSF is positive. The novelty of the HSF is that it respects the autonomy of the GP and brings the expertise towards the GP.

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