Barriers of Implementing Guideline Recommendations of Cardiovascular Risk Management of Hypertension Among Dutch Health Professionals

by

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Graduate Program in Global Health
Duke Kunshan University and Duke University

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Jeffrey Moe

Thesis submitted in partial fulfillment of the requirements for the degree of Master of Science in the Global Health Program
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ABSTRACT

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Abstract

**Background:** Hypertension presents a public health challenge globally, both in developing and developed countries such as the Netherlands. Complications of hypertension accounted for a total number of 10.46 million deaths every year in the world, and disability-adjusted life years associated with high blood pressure is 143.0 million in 2015. Among Dutch people aged between 30 and 70, 31.4% suffer from hypertension. Dutch guideline recommendations for treating patients with SBP between 160 and 180 mmHg is unique: low-risk patients are recommended without BP lowering medication, and middle-risk patients should be treated only in the presence of other risk-increasing factors. For these two groups of patients, guidelines from other countries, like United Kingdom and the United States, suggests “lifestyle advice with prompt drug initiation”. This study explores attitudes of health professionals, the target users of the unique Dutch guideline, towards the risk table and two guideline recommendations of commencing antihypertensive drug treatment for low- and middle-risk patients. In addition to health professionals’ attitude, this study also explores their perceived application barriers of the risk table. The risk table and two recommendations are only a small part of the CVRM guideline. This study focused on the risk table and the two recommendations because these are the guidance for treating hypertension patients.

**Methods:** A cross-sectional, mixed-method study was conducted in the
Netherlands, mainly in Amsterdam. A total of 77 online questionnaires in English were conducted among health professionals in the Netherlands, while 13 face-to-face in-depth interviews in English were conducted among participants in Amsterdam. All participants completed the online questionnaire that assessed their knowledge, attitude, and practice of the Dutch General Practitioner’s Society (Nederlands Huisartsen Genootschap NHG) CVRM guideline and the risk table, as well as their attitude towards the two recommendations of antihypertensive drug prescription for low- and middle-risk patients. The in-depth interview aimed to further explore barriers of applying the risk table and the reasons for their attitude towards the two recommendations.

**Results:** Majority of our survey respondents have positive attitudes towards the NHG CVRM guideline in general and the risk table. Knowledge and attitude are not barriers of applying NHG CVRM guideline. All the respondents reported that they knew the existence of the guideline, and almost all of them (97%) agreed that they knew the guideline content. 92% respondents think that NHG CVRM guidelines are valuable, and 92% report that they believe NHG guidelines are well-supported by scientific evidence. Despite that only 3.9% participants reported they did not apply the risk table to every patient, health professionals perceived lacking important risk factors as an important barrier of applying the risk table.

Regarding attitudes towards pharmacological treatment for low- and middle-risk patients, 66% agreed that middle-risk patients required drug treatment only in the event of risk-increasing factors and SBP > 140mmHg and/or LDL> 2.5 mmol/L, 58% agreed
low-risk patients rarely required drug treatment. The most reported reasons to follow the unique recommendations include: follow the guideline, clinical uncertainty of the persistency of the elevated BP, perceived patient attitude and drug adherence, and drug burden. Confusion of guideline interpretation for treatment advice on low-risk patient with SBP over 180 mmHg is detected in this study.

A significant relationship existed between attitudes towards lowering current treatment threshold and sex (p=.011). Female health professionals were more likely to agree with lowering treatment threshold compared to male.

**Conclusions:** Knowledge is not a barrier of applying NHG CVRM guideline, and attitudes towards the guideline are found to be generally positive. The highest perceived barriers to applying the risk table is lack of important risk factors, for example SES, ethnicity, psychological factors, physical exercise, BMI, family history of CVD, and chronic conditions like chronic kidney diseases and autoimmune disease. Most participants agree that low-risk patients rarely require drug treatment, and middle-risk patients require drug treatment only in the event of risk-increasing factors and SBP>140mmHg and/or LDL>2.5 mmol/L. The most reported reasons to follow the unique recommendations include: follow the guideline, clinical uncertainty of the persistency of the elevated BP, perceived patient attitude and drug adherence, and drug burden. Confusion of guideline interpretation for treatment advice on low-risk patient with SBP over 180 mmHg is detected in this study.
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1. Introduction

1.1 Global Burden of Hypertension

Hypertension remains a public health challenge globally as one of the leading cause of death and disability-adjusted life years. According to a study published in Lancet, elevated blood pressure (BP) was the number one cause of death and disability-adjusted life years in 2010 (Lim et al., 2013). Another study found that the loss of disability-adjusted life-years associated with high BP increased from 95.9 million in 1990 to 143.0 million in 2015 (Forouzanfar, Liu, Roth, & et al., 2017). Dutch National Institute for Public Health and the Environment defined hypertension as having a systolic blood pressure (SBP) of ≥ 140 mmHg and/or a diastolic BP of ≥90 mmHg and/or the reported use of antihypertensive drugs (RIVM, 2014). However, the updated guideline from American College of Cardiology/American Heart Association adjusted and re-classified hypertension as a BP reading of 130/80 mm Hg or higher (ACC, 2017).

Hypertension per se does not cause death or disability, but the associated complications earned its reputation as a ‘silent killer’. It’s well-recognized that hypertension is a major risk factor for cardiovascular disease (CVD), including heart disease and stroke (WHO, 2013). CVD causes 29% of deaths worldwide and 28% of deaths in the Netherlands (Capewell & Graham, 2010). An estimation based on the
global burden of disease in 2016 was that complications of hypertension accounted for a total number of 10.46 million deaths in the world every year (Forouzanfar et al., 2017).

With the aging of the growing population and unhealthy sedentary lifestyle, the number of hypertensive patients is predicted to increase. A study has shown that the global proportion of hypertensive patients will increase to 29% (1.56 billion) by 2025 for both genders (Kearney et al., 2005). Except for an unhealthy sedentary lifestyle, other behavioral risk factors include unhealthy diet, overweight, alcohol abuse and exposure to constant stress (WHO, 2013). Physical inactivity is 1 of 10 leading risk factors for death and 25% of adults globally are not physically active enough (WHO, 2016a). Moreover, overweight (defined as having a BMI ≥ 25 (WHO, 2016b)) and obesity is a worldwide problem and prevalence has doubled since 1980. The WHO reported that over 1.9 billion adults were overweight in 2014 which accounted for 39% of the global population (WHO, 2016).

1.2 Hypertension Burden in The Netherlands

Hypertension is not only prevalent globally, the situation is also dire in high-income countries like the Netherlands. Around 31.4% of the Dutch population aged between 30 and 70 has hypertension (Agyemang et al., 2015). Generally, prevalence of hypertension is higher among men (37.4%) than among women (26.2%), with risk increasing with age (RIVM, 2014). A study in Turkish, Moroccan and native Dutch groups in Amsterdam found a lower prevalence of hypertension in people of Turkish
and Moroccan origin than in native Dutch, except for Turkish women (Agyemang, Ujcic-Voortman, Uitenbroek, Foets, & Droomers, 2006). Additionally, several studies found a high prevalence of hypertension among people from African descent (Agyemang et al., 2015; Agyemang et al., 2011; Putcha et al., 2014). For example, a study by Agyemang et al. in a multi-ethnic cohort in Amsterdam, indicated that although awareness and treatment levels of hypertension were higher in ethnic minority groups compared to Dutch, the level of adequate BP control was lower, particularly for people of African and South-Asian origin (Agyemang et al., 2015). Overall, hypertension control is still inadequate in the Netherlands, especially in ethnic minority groups.

1.3 Hypertension Management in the Dutch Health System

1.3.1 Dutch Health System

Health care in the Netherlands can be divided into preventive care, primary care, secondary care, and long-term care. Preventive services are primarily provided by public health sectors, since health protection and promotion and disease prevention fall under the responsibility of municipalities. Primary care is mostly provided by GPs besides physiotherapists, dentist, psychologists, pharmacists, community workers and midwives. GPs have a gatekeeper function, which means patients must be referred to secondary care by their GP. Secondary care is provided by hospitals and mental health care providers. Access to secondary or specialty care is dependent upon referral by the GP. Lastly, long-term care is provided by home care organizations, nursing homes and
1.3.2 Hypertension Management

Hypertension management is primarily performed in primary care settings. Cardiovascular risk management (CVRM) consists of measuring and monitoring risk factors, creating a CVD risk profile, providing lifestyle counseling and guiding patients with a high risk of morbidity and mortality secondary to CVD (NHG, 2012). The identification of high risk patients is performed via a case-finding approach, this means that a cardiovascular risk profile is created when: 1) a patient visits the practice with questions or complaints that are related to cardiovascular disorders or risk factors, such as smoking, BP or cholesterol; 2) there is a family history of CVD; 3) a patient is visibly overweight; or, 4) possible hypertension/ hypercholesterolemia were previously diagnosed. Later on, a more active approach was adopted in general practice, through which persons more than 45 years old were actively approached in order to identify possible high risk individuals (Nielen MMJ, 2010).

To evaluate patients’ cardiovascular risk profile, one of the steps is to define what their BP is. If the patient has a slightly elevated BP, more measurements can be taken to confirm this elevation. However, if there is dramatically elevated BP with signs of organ damage, the diagnosis is made rapidly. There is substantial within-person variability of BP measurement, meaning that BP readings vary by many factors: the time, place, method of the measurement (Carrera & Lambooij, 2015). Health
professionals can choose either BP reading variations to record in the patient management system and guide their prescription decisions. When raised BP is diagnosed, based on other risk factors and comorbidities, non-pharmacological treatment (including lifestyle and diet advice) or pharmacological treatment is recommended to patients (NHG, 2012).

CVRM is often under the responsibility of specialized nurses, under the supervision of GPs, within a general practice and involves the identification and if necessary, treatment and follow-up of risk factor for CVD. General practices started employing specially-trained doctor’s assistants and nurses after the year 2000, an initiative that was financially supported by health insurance companies. In 2003 one third of Dutch GPs employed a practice nurse; in 2006 this had risen to 70% (van den Berg & Simkens, 2006).

1.3.3 **SCORE and Two Recommendations for Low- and Middle-risk patients.**

European Systematic COronary Risk Evaluation (SCORE) is the risk estimation tool (see Figure 1). This risk chart calculates the 10-year risk of cardiovascular morbidity or mortality for patients without CVD (Dekker JM, 2011). SCORE is based on age, sex, smoking status, SBP, and total cholesterol/ high density lipoprotein cholesterol ratio. The green, yellow, and red in “SCORE-Netherlands” chart indicate an estimated risk of < 10% (low-risk patients), 10-20% (middle-risk patients), and ≥ 20% (high-risk patients)
respectively.

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Figure 1: 10-year risk of morbidity or mortality from CVD for patients without CVD

Source: (Dekker JM, 2011)

Underneath the risk table, there are two specific recommendations on lifestyle advice and medication prescription for low- and middle-risk patients (in the green and
yellow area respectively). More specifically, the two recommendations suggest that for those hypertensive patients who are in the green and yellow area, without CVD history or additional risk factors (i.e. family history of CVD, waist circumference > 88 cm♀/ > 102 cm♂, or Body Mass Index > 30kg/m²), BP lowering medication should not be considered (NHG, 2012).

1.3.4 Uniqueness of Dutch Guideline

These two recommendations are unique features of the Dutch guideline, which suggest that low-risk patients do not need BP lowering medication when their SBP is less than 180 mmHg, and middle-risk patients with SBP less than 180 mmHg should have antihypertensive drug treatment only in the presence of other risk-increasing factors mentioned above. For these two groups of patients, guidelines from other countries, like United Kingdom and the United States, suggests “lifestyle advice with prompt drug initiation (Stewart, Manmathan, & Wilkinson, 2017).

The reasons for the uniqueness are unknown, and current NHG (Nederlands Huisartsen Genootschap, Dutch General Practitioner’s Society) guideline is under revision and will be presented in 2018. In order to bring insights from the target user of the guideline, this is the first paper that explores Dutch health professionals’ attitudes towards applying the risk table, and their attitudes towards the unique guideline recommendations. In addition to the attitude, this study also explores barriers of the implementation of the risk table.
1.4 Study Objectives

This study has a narrow focus and is very specific. We focused on health professionals’ attitude towards applying the risk table, which is only a small part of the guideline. The reason that we focused on the risk table is because of its uniqueness, which will be introduced below.

The survey aims to:

- Determine health professional’s knowledge, attitude, and practice (KAP) towards NHG CVRM guideline in the Netherlands.
- Discern whether the risk table in NHG CVRM guideline is applied and what might be the barriers.
- Determine health professional’s attitudes towards the unique guideline recommendations of pharmacological treatment for low- and middle-risk patients with elevated BP.
- Explore the relationship between demographics and GP’s attitude towards lowering medication threshold.

The in-depth interview aims to:

- Explore further the barriers of using the risk table in NHG CVRM guideline.
- Explore further health professionals’ attitude towards guideline recommendations of treating low-risk patients with SBP over 160 mmHg.
2. Method

2.1 Setting

The Netherlands is a country located in Western Europe and borders Germany, Belgium and the North Sea. Our survey was distributed to health professionals who met our inclusion criteria and were practicing in Randstad area, which is a megalopolis in the central western Netherlands consisting primarily of the four largest Dutch cities (Amsterdam, Rotterdam, The Hague and Utrecht) and their surrounding areas. Interviewees were mainly practicing in Amsterdam.

2.2 Participants

All health professionals who treat hypertensive patients and are currently practicing in Randstad, including GPs, GP’s nurse practitioners, and others (cardiologists or internists), were eligible for recruitment into this study. Health professionals who are not involved in hypertension management are excluded from this study. Variation in participants was based on age, sex, ethnicity, professional type, the type of health care practice they are working in.

2.3 Procedures

2.3.1 Online Survey

We conducted an electronic survey among health professionals involved in
hypertension management in Randstad areas (N = 77). The online survey can be found in the Appendix A. Because of the difficulty in recruiting enough health professionals and other practical issues, we decided to use online survey to reach more participants. We expected that online survey might have lower response rate than printed one, however, online survey can provide participants more privacy and thus the results are more reliable compared to printed surveys. If we had used printed survey, the presence of the researchers could lead to biased responses, giving that our survey questions were mainly attitude-related questions. More specifically, participants could have reported answers that they thought were more desired by the researchers.

After developing and pilot-testing the questionnaire, the final revision was sent to the health professionals by an email linking to the electronic version of the questionnaire. A reminder was sent after several weeks. Before developing the questionnaire, we conducted an extensive literature review to gain an understanding of all the potential barriers and facilitators that health professionals may perceive in adhering to guidelines on managing hypertensive patients. Subsequently, we selected the risk table of 10-year of morbidity or mortality from CVD for patients without CVD from CVRM guidelines. Included in the risk table, two recommendations representing pharmacological treatment initiation for low- and middle-risk patients with hypertension were also selected. The two specific recommendations were to explore to what extent health professionals agree or disagree with the guideline recommendation of drug initiation (including anti-hypertensive drug treatment) for low- and middle-risk
patients. In designing the questionnaire, we adapted an existing validated questionnaire to identify barriers to physician adherence to guidelines (Harmsen, Peters, & Wensing, 2005). Adaption was necessary as the existing questionnaire focused on barriers to guideline adherence in general rather than on barriers to adhering to specific risk assessment tool and its recommendations in the NHG CVRM guidelines.

Upon finishing the design of the survey, three experts in hypertension management and two researchers had a meeting together discussing the wording and validity. Pilot tests were done among six health professionals who fulfilled our inclusion criteria to make the instruments clearer. Adjustments were made according to their feedbacks.

The questionnaires consisted of two sections: demographic information, and barriers to NHG CVRM guideline and the risk table. The demographic section included questions such as age, type of profession, type of practice and number of hours worked weekly, and etc. The barrier section contained six statements on attitudes towards NHG guidelines in general, based on the framework of Cabana (Cabana et al., 1999). A 5-point Likert scale was used to rate the extent of agreement with all the statements (ranging from 1. ‘strongly disagree’ to 5. ‘strongly agree’). This barrier section consisted of 7 statements on the knowledge, attitude, and practice on CVRM guideline in general. In addition, it also consisted of fourteen statements on barriers of applying the risk chart of the CVRM guideline. Three of these statements concerned knowledge of the risk table, six focused on barriers related to attitude, and five on external barriers. In addition to
the barrier statements, one statement concerned the extent that health professionals adhere to the recommendation in practice (‘I apply this risk table in practice’). Furthermore, two recommendations extracted from the risk table were directly used in the survey (Patients with 10-20% risk requires drug treatment only in the event of risk-increasing factors and SBP> 140mmHg and/or LDL> 2.5 mmol/L).

### 2.3.2 In-depth Interview

Semi-structured interviews were used because these enable in-depth exploration of the barriers of applying risk tables and the reasons for the attitudes towards the two recommendations. The interview guide was divided into two parts. The first part was devoted to the barriers of applying the risk table in the NHG CVRM guideline. The second part was devoted to explore whether or not interviewees follow the recommendations to treat low-risk patients with systolic BP of 160mmHg, 160-180mmHg, and over 180mmHg, and why.

All interviews were conducted in English, and the interview guide can be found in the Appendix B (all health professionals have good command in English, translators are not needed). Mengsi Jiang conducted the interviews. First, a pilot interview was conducted among Lizzy Brewster, our local supervisor, one of her colleagues and two medical trainees who treat hypertensive patients. The objective for this pilot interview was to test the structure of the interview and the quality of the interview questions. After the pilot interview, the structure and some of the questions were adjusted.
Thereafter, interviews in the Netherlands were conducted face-to-face at the workplace of the interviewee, only two interviews were conducted via skype, a professional video-chat software, because of the schedule conflict. Interviews were recorded for later analysis and took up to 20 minutes. All interviewee needed to give approval for recording before initiation of recording.

### 2.3.3 Participant Recruitment and Sample Size

Potential participants for both survey and interview were identified via Amsterdam Institute for Global Health and Development’s (AIGHD) network in the Netherlands, using convenient and snowball sampling. First, Lizzy Brewster identified potential participants that fit inclusion criteria and established first contact. Participants were informed of the study by Lizzy Brewster and Mengsi Jiang. Afterwards, potential participants were contacted via email by researchers, in which they were invited for an interview and online questionnaire. Participation in the study, whether in interview or in online survey, was voluntary.

On the front page of the online survey, there is a detailed informed consent form for all participants. The survey lasted 8-14 minutes, and 48 responses were recorded without incentives, which were not sufficient to support our study aims. In order to incentivize more health professionals to participants in this study, we then provided 5-euro digital gift card from www.bol.com, a popular online shopping website in the Netherlands. In total, we had 78 valid survey responses.
An informed consent form has been given to all interview participants. Oral informed consent was given to the health care provider who were interviewed online prior to the interview. All interviews were finished between 15-20 minutes, upon finishing the interview, all participants were given a small gift (a pen and a ceramic bookmark). We conducted 13 interviews. It was validated that a limited number of interviews would generate sufficient insights. A study suggested that data saturation can occur at a relatively low level of twelve, basic elements for meta-themes can even be present as early as six interviews (Guest, Bunce, & Johnson, 2006).

2.4 Ethical Consideration

The study was approved by Duke Kunshan IRB board before the start of the study. An informed consent form, that has been evaluated and approved by Duke Kunshan IRB board, has been given and signed to all interview participants. Oral informed consent was received from the health care providers who were interviewed online prior to the interview. A detailed informed consent form was presented to survey participants on the front page of our online survey. Confidentiality of the interview participants and survey respondents was addressed by collecting data without names or other identifying details. The data was kept safely and only accessible to the principal investigator.
2.5 Measures

The dependent variables of the survey were health professionals’ attitude towards lowering medication threshold. Independent variables were demographic characteristics. The in-depth interview questions addressed relevant issues and sought to answer the research questions and satisfy specific objectives. Each subset of interview questions addressed a specific study objective. The questions attempted to measure the barriers of applying risk tables and initiating drug treatment for low- and middle-risk patients, suggestions for the risk table. Combining the survey data with qualitative data was important in drawing conclusions of the overall study.

2.6 Analysis

Quantitative analysis: Upon the close of collecting online survey responses, raw data were exported from Qualtrics to Excel. We then organized and imported the raw data into StataSE 14.1. Incomplete responses (3/80) were excluded from the analysis. Descriptive statistics were used to describe the demographic and professional characteristics of the health professionals (percentages). In our analysis of the responses on all the statements, we grouped the strongly agree/ agree, indicating agreement; and disagree/ strongly disagree, indicating disagreement.

While analyzing whether health professionals agree or disagree with the guideline recommendation of drug initiation (including anti-hypertensive drug treatment) for low- and middle-risk patients, we calculated the percentage of each 3
scale (agree, neutral, and disagree). Reported attitude towards lowering current treatment threshold constituted the dependent variable, and selected demographics constituted the independent variables.

Qualitative analysis: Data was collected in June and July 2017. After interviews were conducted they were transcribed. Transcripts were read carefully and Braun’s six phases thematic analysis was applied (Braun & Clarke, 2006). First, familiarization with data took place through transcribing the interviews and carefully reading and reviewing the data, from which initial ideas were noted. Second, initial codes were constructed based on the concepts in previous literature (Cabana et al., 1999). Coding was performed by using NVivo 11.4.3, the codes were grouped into overarching themes that corresponded with the framework built based on previous literature. Third, findings were discussed among two researchers, Jingyu Tong and Mengsi Jiang, to ensure agreement over concepts and coding. Fourth, the constructed themes were reviewed and refined to eliminate, add or compound certain concepts. Fifth, themes and concepts were defined. Lastly, interesting examples and quotations were deduced selectively from the transcripts for final analysis of these selected quotations. This final analysis was related to the research questions so that ultimately, this allowed presentation of analysis in report form (Braun & Clarke, 2006).

Thematic coding of the data was based on a clear conceptual framework adapted from Cabana (Cabana et al., 1999). By using this framework, internal validity was strengthened. For external validity, bias in questions, answers, data reporting and
interviewer bias were reduced whenever possible. Interviewer bias was reduced through remaining neutral in tone and body language and by not giving a personal opinion. The interview guide was checked by professionals within AIGHD’s network prior to data collection. For reducing biases in answers, the topics and questions were in logical order, clarification of answers was asked and trust was built. Lastly, in order to reduce bias in reporting of data, two researchers, Jingyu Tong and Mengsi Jiang, discussed initial concepts and themes derived from the interview transcripts.

3. Results

3.1 Quantitative Results

3.1.1 Description of The Sample

Table 1 summarizes the demographic characteristics of the responding health professionals. The majority of respondents were female (58%), most were Caucasian Dutch (77%) who worked as a GP (81%). For the age groups, 31% of them were more than 50 years, 29% were between 35 and 50 years, and 17% were less than 35 years.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>32</td>
<td>41.56</td>
</tr>
<tr>
<td>Female</td>
<td>45</td>
<td>58.44</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;35</td>
<td>17</td>
<td>22.08</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>Count</td>
<td>Percentage</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------</td>
<td>------------</td>
</tr>
<tr>
<td>Caucasian Dutch</td>
<td>59</td>
<td>76.62</td>
</tr>
<tr>
<td>African Origin</td>
<td>2</td>
<td>2.6</td>
</tr>
<tr>
<td>Asian Origin</td>
<td>10</td>
<td>12.99</td>
</tr>
<tr>
<td>Others</td>
<td>5</td>
<td>6.49</td>
</tr>
<tr>
<td>Missing</td>
<td>1</td>
<td>1.30</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of physician</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GP</td>
<td>62</td>
<td>80.52</td>
</tr>
<tr>
<td>Nurse</td>
<td>7</td>
<td>9.09</td>
</tr>
<tr>
<td>Specialists</td>
<td>8</td>
<td>10.39</td>
</tr>
</tbody>
</table>

3.1.2 KAP Towards NHG CVRM Guideline

All the respondents reported that they knew the existence of the guideline, and almost all of them (97%) agreed that they knew the guideline content (Figure 2). In addition, most of the respondents (92%) agreed to the statement that NHG CVRM guidelines were valuable sources of advice. 92% reported that they believed that NHG guidelines were well-supported by scientific evidence and agreed that the use of guidelines can improve the quality of patient care. In addition, only 5% participants reported resistance to following the guidelines in general.
Figure 2: Health professionals’ ratings on statements measuring the knowledge, attitude, and practice towards NHG CVRM guideline

3.1.3 Attitudes Towards the Risk Table and Perceived Implementation Barriers

Figure 3 shows the proportion of participants who apply the risk table in practice. Among 69 GPs and GP’s nurses, majority of our participants apply the risk table (98.6%). Among 8 specialists, most of the participants applied the risk table (75.0%).
Figure 3: Application of the risk table among health professionals

Figure 4 summarizes the percentage of respondents that agrees that specific barriers apply to risk table. Overall, the percentage of health professionals that agreed that barriers were applicable to the risk table varied from 3.9% on lack of awareness to 76.6% on the risk table lack important risk factors. Outdated evidence of the guideline was second most perceived barriers of applying the risk table by participants (53.2%). Among external barriers, lack of time/resources and lack of reimbursement were 7.8% and 24.7% respectively. Regarding drug treatment threshold, most participants remain neutral (48.0%), the number of participants who think the guideline threshold should be lowered (24.7%) is close to their counterparts (27.3%).
Figure 4: Barriers of applying the risk table

Overall, majority of our participants (96.1%) apply the risk table and most perceived barriers of applying the risk table include: lack important risk factors (76.6%), and outdated evidence (53.2%).

### 3.1.4 Attitudes Towards the Two Guideline Recommendations

Most of respondents (66%) agreed that middle-risk patients require drug treatment only in the event of risk-increasing factors and SBP> 140mmHg and/or LDL> 2.5 mmol/L. In addition, most of the respondents (58%) agreed low-risk patients rarely required drug treatment (see Figure 5).
3.1.5 Relationship of Demographics and Attitudes to Lower Medication Threshold

Current NHG CVRM guideline identify 20% risk of morbidity or mortality from CVD as high risk and recommend health professionals to prescribe medication for this group of patients. Table 2 summarizes the number and percentage of GPs respondents agree or disagree with lowering current treatment threshold (20%) by demographic characteristics, as well as Chi2 test or fisher’s exact test of the relationship between demographic characteristics and the attitude towards lowering the treatment threshold.

A significant relationship existed between sex and GP’s attitudes towards lowering current treatment threshold (p=.011). Of the 62 GP participants, 10 (16.1%) participants agreed to lower treatment threshold while 20 (32.3%) disagreed. Among male GP participants, 7.4% (n=2) participants agreed to lower treatment threshold while 51.9% (n=14) disagreed. Among female, 22.9% (n=8) participants agreed to lower treatment threshold while 17.1% (n=6) disagreed. This indicated that gender might play
a role in whether a person agree or disagree with lower treatment threshold. Female was more likely to agree with lowering treatment threshold compared to male health professionals.

Table 2: Cross-tabulation of demographics and lowering medication threshold (among GPs, N=62)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Whole Sample</th>
<th>Threshold Should Be Lowered</th>
<th>P-Value (Chi2 or Fisher’s Exact)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Agree (% )</td>
<td>Neutral (%)</td>
</tr>
<tr>
<td>Total</td>
<td>62</td>
<td>10 (16.1)</td>
<td>32 (51.6)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>27</td>
<td>2 (7.4)</td>
<td>11 (40.7)</td>
</tr>
<tr>
<td>Female</td>
<td>35</td>
<td>8 (22.9)</td>
<td>21 (60.0)</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;35</td>
<td>24</td>
<td>4 (16.7)</td>
<td>15 (62.5)</td>
</tr>
<tr>
<td>35-50</td>
<td>22</td>
<td>3 (13.6)</td>
<td>12 (54.6)</td>
</tr>
<tr>
<td>&gt;50</td>
<td>16</td>
<td>3 (18.8)</td>
<td>5 (31.2)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White Dutch</td>
<td>50</td>
<td>8 (16.0)</td>
<td>24 (48.0)</td>
</tr>
<tr>
<td>Others</td>
<td>12</td>
<td>2 (16.7)</td>
<td>8 (66.7)</td>
</tr>
<tr>
<td>Type of practice</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solo</td>
<td>11</td>
<td>2 (18.2)</td>
<td>7 (63.6)</td>
</tr>
<tr>
<td>Dual</td>
<td>17</td>
<td>3 (17.6)</td>
<td>6 (35.3)</td>
</tr>
<tr>
<td>Group</td>
<td>34</td>
<td>5 (14.7)</td>
<td>19 (55.9)</td>
</tr>
</tbody>
</table>

3.2 Qualitative Results

There were 13 responses in total, and most of the interviewees were general practitioners (61.5%), male (53.8%), aged between 35 to 50 years (53.8%), and were predominantly white Dutch (92.31%) (see table 3).
Table 3: Demographics of interviewees

<table>
<thead>
<tr>
<th></th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Professional background</strong></td>
<td></td>
</tr>
<tr>
<td>General practitioner</td>
<td>8 (61.5)</td>
</tr>
<tr>
<td>Nurse practitioner or office assistant</td>
<td>2 (15.4)</td>
</tr>
<tr>
<td>Cardiologist and others</td>
<td>3 (23.1)</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>6 (46.2)</td>
</tr>
<tr>
<td>Male</td>
<td>7 (53.8)</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
</tr>
<tr>
<td>No more than 35</td>
<td>5 (38.5)</td>
</tr>
<tr>
<td>35 to 50</td>
<td>7 (53.8)</td>
</tr>
<tr>
<td>More than 50</td>
<td>1 (7.7)</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
</tr>
<tr>
<td>Caucasian Dutch</td>
<td>12 (92.3)</td>
</tr>
<tr>
<td>Others</td>
<td>1 (7.7)</td>
</tr>
</tbody>
</table>

### 3.2.1 Barriers of Applying the Risk Table

Even though majority of the interviews (12/13) responded the application of the risk table, including 2 specialists, some barriers were reported that might influence the application (specialists reported occasionally use the risk table). Reported barriers of applying the risk table include: lack important risk factors, time constraint, outdated evidence, and treatment threshold (see table 4).

**Lack Important Risk Factors (13/13)**

All the interviewees reported that the risk table was not applicable to some group of patients, because some important risk factors were not included in the risk table. Risk factors reported missing by the participants include: social-economic status (SES), ethnicity, psychological factors, physical exercise, body-mass index (BMI),
family history of CVD, and chronic condition like chronic kidney diseases and autoimmune disease (rheumatoid arthritis).

“I think there are many factors that are not involved in the risk score when you sometimes feel they should be taking into account as well, for instance, …not having physical exercise… another factor that could be BMI… there are some other factors like family history, or kidney diseases, "brain for instance, or rheumatoid arthritis that are diseases that can play a role in risk prediction but it is not really clear what role it should be.” (male GP, aged 35-50 years)

“That (Q risk score) would be a bit more specific, and a bit more personalized because they included more risk factors.” (male GP, aged 35-50 years)

Incorporating additional risk factors on printed risk table could risk to make the assessment more complicated than the current one. Many health professionals (7/13) reported the application of online tool, for example SCOREMETERS and QRISK, in daily practice and commented positively, saying it was “continuous” and “easier” to use. Some reported that QRISK assessment tool incorporated more risk factors.

“What I like about the online version is that you just enter the statistics, so age, smoking, you know them, and then they come back with the table and show you the normal risk and show you also a graph with the risk of the patient.” (female GP, aged 35-50 years)

“I think the best would be if this would be like included in your patient information system so you fill it in, they automatically there come an advice you just can say yes I accept, and enter and then there is advice for medication I think that would be easy.” (female GP, aged 35-50 years)

Time Constraint (8/13)
Environmental factors were a prominent barrier to apply the risk table. The barrier mostly referred to time constraints by interviewees (8/13).

“But it takes time, and if I have not practice nurse, then it takes much more time, that’s true.”

(female GP, aged 35-50 years)

“So I think, and I have time to discuss with the patient, I have more time than the general practitioners.” (female nurse, aged >50 years)

Outdated Evidence (6/13)

There was an element of distrust toward the underpinning evidence, mainly because it was outdated (6/13). This distrust was reflected in the comments such as

“That’s (the risk table) a really slow incorporating evidence, so the guidelines for GP are the worst guidelines because they always behind what’s really at the topic when it gets to change.”

(male cardiologist, aged 35-50 years)

Treatment Threshold (4/13)

Some participants (4/13) reported that the treatment threshold should be adjusted lower. They imply that the risk table undertreated people under 40 years old.

“Some people specifically if you are young, then you are always green, so yeah, if you are 40 years like me, if I would have a blood pressure of 180, they (guideline) would say you are okay whereas I would say my blood pressure is 180 or 200 maybe I should do something” (male GP, aged 35-50 years)
3.2.2 Attitudes Towards the Two Guideline Recommendations

Table 4 summaries interviewees’ responses for whether or not they prescribe drug treatment for low-risk patients. For low-risk patients with SBP between 160 and 180 mmHg, 10/10 GPs reported to follow the guideline and give lifestyle advice only, without drug initiation for the patient unless the patients require the drug treatment. 3 specialists responded that they would initiate drug treatment despite that they are low-risk patients. For low-risk patients with SBP between over 180 mmHg, almost all interviewees responded that they would be inclined to start the medication if the measurement is correct, but also decide together with the patients. There were two participants reported nonpharmacological treatment.

Table 4: Drug initiation for low-risk patients with SBP over 160 mmHg

<table>
<thead>
<tr>
<th>Medication</th>
<th>SBP between 160-180 mmHg</th>
<th>SBP over 180 mmHg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GP/ nurses (10)</td>
<td>Specialists (3)</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>No</td>
<td>10</td>
<td>0</td>
</tr>
</tbody>
</table>

SBP Between 160-180 mmHg

When asked about whether or not to prescribe drug treatment for low-risk patients with SBP between 160 and 180 mmHg, almost all interviewees responded that they would decide together with the patients. However, when asked about their
tendency, 10/10 GPs reported to follow the guideline and give lifestyle advice only, without drug initiation for the patient unless the patients require the drug treatment. GP interviewees reasons for no drug initiation include: follow the guideline (8/10), clinical uncertainty of the persistency of the elevated BP (8/10), perceived patient attitude and drug adherence (4/10), and drug burden (4/10) (see Table 5).

Table 5: Reasons for no drug initiation for low-risk patients

<table>
<thead>
<tr>
<th>Reason</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Follow guideline (8/10)</td>
<td>“…I follow the guidelines and don’t start.” (female GP, aged &lt;35 years)</td>
</tr>
<tr>
<td></td>
<td>“I would explain the risk, I would also explain that according to the study results (from the guideline), she would not necessary need medication.” (male GP, aged &lt;35 years)</td>
</tr>
<tr>
<td>Clinical uncertainty (8/10)</td>
<td>“I think a good suggestion would be you start with lifestyle advice, but you do a 24-hour (ambulatory) blood pressure measurement, just to be sure this is not always this high…I will wait for 6 months or 1 year (before start medication)” (male GP, aged 35-50 years)</td>
</tr>
<tr>
<td>Perceived patient attitude and adherence (4/10)</td>
<td>“They won’t use it because they can’t feel like I am getting high blood pressure, they can’t feel their blood pressure. So it’s not, and when you say it’s really important they wouldn’t take it, I don’t need it because the risk is very low.” (female GP, aged 35-50 years)</td>
</tr>
<tr>
<td>Drug burden (4/10)</td>
<td>“Because of the side effect…it’s better to start the lifestyle change.”</td>
</tr>
<tr>
<td></td>
<td>(female nurse, aged &gt;50 years)</td>
</tr>
<tr>
<td></td>
<td>“No, because it is really hard for people to use medication EVERYDAY.”</td>
</tr>
<tr>
<td></td>
<td>(female GP, aged &gt;50 years)</td>
</tr>
</tbody>
</table>

3 specialists responded that they would initiate drug treatment despite that they are low-risk patients. The reported reasons include: lifestyle advice is ineffective (3/3), high-risk of complication (3/3), different patient group (1/3).
“Risk communication with the patient and lifestyle change advice usually don’t work, in the end, you will have to use medication to bring that blood pressure down.” (male specialist, aged 35-50 years)

“Even though you have low risk for CVD, but your blood pressure is too high and it is dangerous without medication. They have high risk of getting stroke. Lifestyle is not easy to change” (male specialist, aged 35-50 years)

“We have very different patient group, we see a lot of patients with hypertension complications” (male specialist, aged 35-50 years)

**SBP over 180 mmHg**

When asked about whether or not to prescribe drug treatment for low-risk patients with SBP between over 180 mmHg, almost all interviewees responded that they would be inclined to start the medication if the BP measurement is correct, but also decide together with the patients. They also reported that this treatment is according to the guideline.

“The way I read guideline is that blood pressure, systolic less than 180, we have more time before the drug commencement, I usually wait for 1 year. If blood pressure is over 180, then drug should be immediately used.” (male GP, aged 35-50 years)

There were two participants reported nonpharmacological treatment if there were no signs of target organ damage.

“As long as the risk is less than 10%, I follow the guideline and don’t treat.” (male GP, aged <35 years)
“The risk is too low according to the evidence (of the guideline), I wait for 3-6 months and see what happens, and I decide together with the patient” (male GP, aged 35-50 years)

Confusion of guideline interpretation for treatment advice on low-risk patient with SBP over 180 mmHg is detected in this study.

4. Discussion

4.1 KAP of NHG CVRM Guideline

Majority of our survey respondents have positive attitudes towards the NHG CVRM guideline. Survey findings suggest that knowledge is not a barrier of applying the guideline. Attitudes towards the guideline are found to be positive, for example, 92% respondents think that NHG CVRM guidelines are valuable, and 92% report that they believe NHG guidelines are well-supported by scientific evidence. Our findings are consistent with similar studies on other guidelines (Cabana et al., 2000; Francke, Smit, de Veer, & Mistiaen, 2008). However, positive attitudes towards guideline in general does not necessary translate into optimal guideline adherence, and different guideline, even different recommendations entail different barriers.

4.2 Attitudes Towards Applying the Risk Table and Its Implementation Barriers

The discussion in this section combined findings from both survey and interviews to have rich information. Most health professionals have positive attitude
towards the risk table, and the risk table is reported to be widely applied by both survey participants (96.1%) and interview participants (92.3%). Despite positive attitude and high reported application rate, health professionals still perceived some barriers towards applying the risk table. This discrepancy between high implementation rate and perceived implementation barriers could be because that our study only focused on whether they apply the risk table or not, without catching the nuance of how frequently they apply the risk table. In other words, the implementation barriers reported could influence the frequency of applying the risk table. Another reason could be because of sampling bias. Our study sample size was small, which did not allow us to explore the relationship between attitude and reported application rate, nor did it allow us to explore the relationship between perceived implementation barriers and application rate.

Both qualitative and quantitative results suggested that the most prominent barrier was lack of important risk factors. Interviewees data further enriched the findings, indicating that important risk factors include: SES, ethnicity, psychological factors, physical exercise, BMI, family history of CVD, and chronic condition like chronic kidney diseases and autoimmune disease (rheumatoid arthritis). In other words, health professionals perceived the risk table not being applicable due to heterogeneity of patient populations. Other studies also demonstrated that lack of applicability is an important barrier to guideline adherence, particularly to patients with comorbidity (Davis & Taylor-Vaisey, 1997; Francke et al., 2008; Smith, Walker, & Gilhooly, 2004).
Incorporating more risk factors on printed risk table could compromise its simplicity. In addition to the lack of applicability, another prominent barrier found in the survey and interview was that the underlying evidence was outdated (53.2% and 46.2% respectively). Thus, a user-friendly web-based risk assessment tool that incorporates more risk factors, and can be continually updated with new evidence could be developed to promote guideline adherence. 7 out of 13 interviewees also reported the application of online tool, for example SCOREMETERS and QRISK, in daily practice and commented positively.

Our study did not find knowledge as a barrier to applying the risk table, which was inconsistent with other studies (Francke et al., 2008; Lugtenberg, Zegers-van Schaick, Westert, & Burgers, 2009). The inconsistency might be due to the fact that our study focused on the risk table in CVRM guideline, while other studies either focused on different guidelines in general or other key recommendations. Because the risk assessment tool in our study was simple and well-known. Another reason might be reporting bias as the knowledge is self-rated. As many studies found knowledge as a barrier to apply the guideline recommendations, it may be useful to regularly conduct sessions among health professionals to improve knowledge on guidelines (Davis & Taylor-Vaisey, 1997; Francke et al., 2008; Lugtenberg et al., 2009; Smith et al., 2004).

4.3 Attitudes Towards the Two Recommendations

The same as the last section, this section also combined findings from both
survey and interviews to have rich information. In exploring attitudes towards pharmacological treatment for low- and middle-risk patients, the survey findings indicate that most of the participants (58% and 66% respectively) agree with the two recommendations in the guideline for low- and middle-risk patients respectively. Which indicates that most of the participants think that low-risk patients rarely required drug treatment, and middle-risk patients require drug treatment only in the event of risk-increasing factors and SBP> 140mmHg and/or LDL> 2.5 mmol/L.

For low-risk patient with SBP between 160 and 180 mmHg, all GP interviewees (10/10) reported to follow the guideline and give lifestyle advice only, without drug initiation, unless the patients require the drug treatment. Their reasons for no drug initiation include: follow the guideline (8/10), clinical uncertainty of the persistency of the elevated BP (8/10), perceived patient attitude and drug adherence (4/10), and drug burden (4/10). The last three reasons are also challenges found in managing hypertension (Howes, Hansen, Williams, & Nelson, 2010). The role of the most reported reason, which is to follow the guideline, could be overrated because of reporting bias. However, the aim was to explore the perceived reasons for treatment decisions, not to quantify the importance of each reasons. Future study could quantify this qualitative finding. In addition, another reason for participants’ high treatment threshold could be that their treatment threshold is high in the first place, which was not discerned in this study. This could be further explored in the future studies.
For low-risk patient with SBP over 180 mmHg, 2/10 interviewees reported to follow the guideline and give lifestyle advice only, without immediate drug initiation. Interestingly, 8/10 interviewees also reported to follow the guideline and initiate drug treatment immediately. Confusion of guideline interpretation for treatment advice on low-risk patient with SBP over 180 mmHg is detected in this study. Clearer guidance on the drug treatment for this group is needed.

4.4 Relationship of Demographics and Attitudes to Lower Medication Threshold

Gender might be associated with GP’s attitude towards pharmacological treatment for low and middle-risk patients. Female GPs are more likely to agree with lowering treatment threshold compared with their counterparts. This finding is subject to sampling bias. Existed literature only found female patients were more likely than men to be aware of their HTN and seek treatment for it among adults younger than 60 years (Engberding & Wenger, 2012). Gender difference on GP’s attitude to lowering medication threshold found in this study could guide future gender-specific interventions that address medication threshold. However, the limited representativeness of our data should be taken into consideration of this finding.

4.5 Study Strengths and Limitations

The major strength of this study lies in the study design, using both quantitative
and qualitative data to complement each other. This combination not only enriches the data but also provides room for verification of data. The survey can quantify the prevalence of the barriers that apply to the risk table and the CVRM guideline in a larger sample across the target group, while qualitative studies can provide detailed insight in the range of barriers.

Our interview focused on barriers to the risk table and treatment for low-risk patients in practice. Our in-depth analysis of barriers provides detailed information on potential interventions needed to improve the risk assessment tool. This information can be used by various professional groups or organizations to further improve the risk table in the guideline. For example, all of our interviewees reported that lack of important risk factors is a barrier to apply the risk table. The findings from our study may be useful for guideline developers in the process of updating the guidelines to raise the acceptance and applicability of the risk assessment tool.

Several limitations should be considered in interpreting our findings. First, we used convenience sampling and snowball sampling for online questionnaire and in-depth interview, which might have caused sampling bias, thus the results might not be representative of the health professionals practicing in the Randstad area of the Netherlands. Secondly, our interview collected opinions from a small sample of health professionals. Thirdly, both survey and interview participants are predominantly GPs. Even though low- and middle-risk patients are supposedly managed in the general practice, specialists in our study also reported to encounter non high-risk patients. In
addition, risk table is reported to be used by the specialists as well, it might be useful to include more specialists in the study. However, the aim of our study was to identify possible barriers and treatment for low- and middle-risk patients qualitatively, rather than quantifying their relative importance among a representative group of health professionals. Results from this study can be used as input for a survey to be conducted among a larger sample of health professionals in order to quantify our qualitative findings.

In addition, all the information in our survey was self-reported and therefore could have been biased in several ways. First, responses of to what extent health professionals agree that they apply the risk table to every patient could have been influenced by social desirability bias during the online survey.

Furthermore, our study has a very narrow focus, we only studied the risk table in the CVRM guideline and two recommendations for treating low- and middle-risk patients, which limited the external validity of the findings. Nevertheless, the aim of this study is to explore Dutch health professionals’ attitudes towards the uniqueness of hypertension treatment guidance among low- and middle-risk patients, which include the risk table in the two recommendations.

Lastly, due to the practical issues, our survey was conducted online, with a very low response rate. Thus the findings from the survey should be interpreted cautiously. Despite of this limitation, online survey provided participants more privacy and thus the results are more reliable compared to printed ones.
5. Conclusion

Knowledge is not a barrier of applying NHG CVRM guideline. Attitudes towards the guideline are found to be generally positive, for example, 92% respondents think that NHG CVRM guidelines are valuable, and 92% report that they believe NHG guidelines are well-supported by scientific evidence.

Health professionals in the Netherlands have positive attitude towards the risk table, and are reported to be widely applied. The most perceived barriers of applying the risk table is lack of important risk factors, for example SES, ethnicity, psychological factors, physical exercise, BMI, family history of CVD, and chronic conditions like chronic kidney diseases and autoimmune disease. Therefore, future updates on the risk assessment tool, could take some of these barriers into consideration to encourage more extensive application.

Most participants agree that low-risk patients rarely require drug treatment, and patients with 10-20% risk require drug treatment only in the event of risk-increasing factors and SBP> 140mmHg and/or LDL> 2.5 mmol/L. In other words, participants agree with pharmacological treatment recommendations for low- and middle-risk risk patients. The most reported reasons to follow the unique recommendations include: follow the guideline (8/10), clinical uncertainty of the persistency of the elevated BP (8/10), perceived patient attitude and drug adherence (4/10), and drug burden (4/10). Further research is needed to weigh the advantages and disadvantages for such unique recommendations.
Confusion of guideline interpretation for treatment advice on low-risk patient with SBP over 180 mmHg is detected in this study. Clearer guidance on the drug treatment for this group is needed.
Appendix A

Barriers of Implementing Guideline Recommendations of Cardiovascular Risk Management of Hypertension Among Dutch Health Professionals

Principal Investigator: Mengsi Jiang
Supervisor: L.M. Brewster; Lijing Yan; Vanessa Harris

Introduction of the Research

This is a study funded by Duke Kunshan University (DKU), co-implemented by DKU, Amsterdam Institute of Global Health and Development (AIGHD) and Amsterdam Health and Technology Institute (AHTI). The study consists of 20 questions and it will take you around 10 minutes.

The result of the study will be presented as two theses in MSc in Global Health and 2-3 academic papers, all of which will be shared with you before publishing if you wish to do so.

This questionnaire is divided into two parts:

- Health professionals’ perceptions of ethnic disparities in hypertension control in the Netherlands
- Health professional’s knowledge, attitude, and practice towards the hypertension management guidelines to manage hypertensive patients with less than 20% risk of 10-year mortality and morbidity of CVD
- Demographic information
Your input can contribute to better understanding of hypertension treatment and management, as well as informing further studies of effective measures to reduce the ethnic disparity in hypertension control.

Please check the answer that best describes your agreement or disagreement with each statement. There is no right or wrong answer and the result of the questionnaire will be anonymous.

Question 6-10 aims to

- Determine the knowledge, attitude, and practice of health professionals towards the hypertension management guidelines to manage hypertensive patients with less than 20% risk of 10-year mortality and morbidity of CVD in the Netherlands.
- Explore health professional’s perception on the barriers of using guidelines.

All the Statements below are about the management of hypertensive patients with less than 20% risk of mortality and morbidity of CVD in the Netherlands.

Please check the answer that best describes your agreement or disagreement with each statement. There is no right or wrong answer and the result of the questionnaire will be anonymous.

- 1 indicates strongly agree
- 2 indicates agree
- 3 indicates neutral
- 4 indicates disagree
6/20. Below are statements about your knowledge and attitudes toward the Nederlands Huisartsen Genootschap (NHG) Cardiovascular Risk Management (CVRM) guideline.

<table>
<thead>
<tr>
<th>Statement</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>I know the existence of the guidelines</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>I know the content of the guidelines</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>It is a valuable source of advice</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>It is well supported by scientific evidence</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>The use of the guidelines can improve the quality of patient care</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>I apply the guidelines for every patient</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>I generally resist following the guidelines</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>

7/20. Below are statements about your knowledge and attitudes toward the content of the above NHG CVRM risk table.

<table>
<thead>
<tr>
<th>Statement</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>I am aware of the existence of the risk table</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>I know how to assess patients' risk according to the risk table</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>The risk table is clear and understandable</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>The risk table needs to be revised (it is outdated)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Patients with less than 10% risk rarely requires drug treatment</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>
Patients with 10-20% risk requires drug treatment only in the event of risk-increasing factors and SBP > 140 mmHg and/or LDL > 2.5 mmol/L

I think the threshold for initiating drug treatment should be adjusted lower than 20% risk

8/20. Below are statements about the applicability of the NHG CVRM risk table.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>I apply the risk table in practice</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>The risk table is difficult to apply in practice</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>The risk table takes too little account of individual characteristics of patients or ethnic groups</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Applying the risk table leads to better patient care</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>I lack sufficient knowledge/ skills to properly apply the risk table</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>I am having trouble changing my existing routines for applying the risk table</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>

9/20 Below are statements about factors related to the patient or the environment which may affect the practice of the NHG CVRM risk table.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>

42
Initiating anti-hypertensive is against patients’ wishes and preferences

Organizational matter (e.g. working hours, payment method, insufficient staff) makes is difficult to apply the risk table

Lack of communication, clear division of tasks or cooperation with other health care providers make it difficult to apply the risk table

Financial compensation increases using the risk table

Due to the pressure from insurance companies, I find it difficult to initiate treatment for low- and middle-risk patients

10/20. Please write down any other suggestions regarding the content or the application of the risk table.

11/20. Including yourself, how many GPs and office assistants in average are working in one of your practices?

12/20. What type of practice are you working in?

  o Solo
  
  o Dual
  
  o Group practice/ health center/ hospital

13/20. Please estimate the number of patients in your practice

14/20. How many hours per week do you work as a cardiologist/ General Practitioner (GP) including Huisarts assistant in opleiding (HAIO)/ office assistant?

15/20. What is your professional background?
- GP
- Nurse
- Cardiologist

16/20. Years since graduation from medical school or equivalent clinical training degree?
- 11
- 11-20
- 20-27
- 27
- Don’t have medical degree

18/20. What's your gender?
- Male
- Female

19/20. What is your age?
- <30
- 30-50
- >50

20/20. What is your ethnicity?
- White Dutch
- African origin
- Asian origin
- Others
- Don't want to answer
Appendix B

Barriers of Implementing Guideline Recommendations of Cardiovascular Risk Management of Hypertension Among Dutch Health Professionals: Interview Guide
MSc-GH student: Mengsi Jiang

Table 1: Risk Table: 10-year of morbidity or mortality from cardiovascular disease (CVD) for patients without CVD
**Aim:** To identify barriers of using risk tables on management of hypertensive patients with low- and middle-risk of 10-year mortality and morbidity of CVD in the Netherlands. Interview will last up to 30min, and be audio recorded if consent is provided. Participation is completely voluntary and the interviewee has a right to withdraw participation during or after the interview.

**Step 1:** Introduce myself and read out relevant sections in Consent Form to interview participants

**Step 2:** Consenting participants to sign the Consent Form

**Step 3:** Casually chat with the participant to build rapport

**Step 4:** Read the notes and ask the questions below:

Notes:

The risk table refers to 10-year mortality and morbidity of CVD in the NHG CV Risk Management Guideline.

All the patients mentioned below are hypertensive patients with less than 20% risk of mortality and morbidity of CVD.

1. Do you practice this risk table?

2. Do you use other reference instead? If so, what is it?

3. What are the advantages and disadvantages of the risk table?

4. Do you have other suggestions regarding the content and application of the risk table?

5. A 55-year old female non-smoker, with total cholesterol/HDL 6 and three correct readings of HBP 140-160mmHg, 160-180mmHg, more than 180mmHg, would you initiate her drug treatment? Why or why not?

6. Does insurance company affect your decision on whether or not to treat these patients? If so, how?

**Step 5:** Thank the interviewee for their time and contribution and hand over the small gift.
References


