Perceptions of Dutch Health Professionals about Ethnic Disparity in Hypertension Control

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 Graduate Program
in Global Health in the Graduate School of
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ABSTRACT

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Abstract

Background: In pace with globalization, the ethnic disparity in hypertension control is becoming a threat to positive outcomes in global health. Within countries with high ethnic diversity, for example, the Netherlands, ethnic disparity is a significant issue. The reasons for ethnic disparity in hypertension control are not well understood. Dutch health professionals directly interface with the health system and patients. As such, evaluating Dutch health professionals' perceptions plays a pivotal role in understanding ethnic disparity in hypertension control. Although collecting ethnicity information may be useful in studying and reducing ethnic disparity in hypertension control, within the Dutch health system, ethnic information is hardly complete. Additionally, it is important to explore the health professionals' attitude towards collecting ethnicity information.

Methods: This is a cross-sectional mixed-methods study, using both quantitative (online survey) and qualitative (in-depth interviews) data collection methods. Convenient and snowball sampling were utilized when identifying potential participants practicing in the Dutch urban Randstad area. After sending out invitation letter to potential participants through email, 77 online surveys were collected using Qualtrics. In addition, 13 in-depth interviews were conducted.

Results: Respondents were mainly general practitioners (80.5%), female (58.4%), and predominantly White Dutch (76.6%)—noting that in Amsterdam, 48% of the general population is White Dutch (Republiek Allochtonie, 2016). Most providers (79.2%) had ethnically diverse patients. Nearly all the respondents (98.8%) reported the collection of

patients' ethnicity data as important. The most frequently cited reason was that these data can help respondents to better evaluate patients' risk and make better treatment plans. While 81.3% of the participants reported that ethnic disparity in hypertension control was a problem in the Netherlands, only 55.8% thought it was a problem among their own patients. The argument they claimed was that compared with the general situation in big cities in the Netherlands, their own patients were not that ethnically diverse. Also, some of them reported that they performed better than other health professionals. The majority of health professionals placed more emphasis on the contribution of patient-related factors to ethnic disparity in hypertension control compared with health professional-related factors. They argued that in the end it was patients who should take the medication and change their unhealthy lifestyle, so the biggest responsibility was on them. The program most frequently cited as "Very effective" was aimed at improving health professionals' awareness of ethnic disparity in hypertension control (50.6%). Nearly 88.5% of participants acknowledged the ethnic-specific training they received in reducing ethnic disparity in hypertension control. Other strategies, including programs targeting at nurses, were also recommended by participants in reducing ethnic disparity in hypertension control.

Conclusion: The majority of health professionals supported collecting ethnicity information and acknowledged it could help reduce ethnic disparity in hypertension control. Therefore, the health system in the Netherlands should launch programs facilitating the collection of ethnicity information in primary care. However, few studies

have assessed patients' attitudes towards having their ethnicity information collected, and more research will be needed. Also, as nurses spend more time working with hypertensives than doctors and other care providers, they should be the target population in future studies assessing health professionals' knowledge, attitudes, and perceptions on ethnic disparity in hypertension care.

Dedication

To my parents, Li Cui and Chang Tong, who cared about me and encouraged me during this process. To my boyfriend, Lvfan Feng, who mentally supported me and offered me technical assistance. Most importantly, I would like to dedicate this thesis to the health professionals who are fighting against the ethnical disparity in hypertension control. Because of them, global health is not an unachievable goal. It is my sincere hope that they can be particularly diligent when managing hypertension among ethnic minority groups.

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1.Introduction

As the key risk factor for heart disease, stroke, and renal disease, hypertension continues to represent a growing public health concern around the world. Hypertension is the leading contributor to premature mortality and disability. Hypertension accounts for 9.4 million deaths every year, nearly one fifth of the total number of deaths (Organization, 2013). With demographic ageing, rapid urbanization, and the globalization of unhealthy lifestyles, hypertension is increasingly affecting people worldwide. During the first 25 years of the 21st century, the disease burden of hypertension is expected to increase by 60% globally, with an estimated 1.56 billion hypertensive individuals in the world (Lackland & Weber, 2015).

1.1 Hypertension

1.1.1 Hypertension in the Netherlands

The Netherlands has a great burden of hypertension. Generally the prevalence of hypertension is higher among men (39.1%) than among women (33.8%) (Mills et al., 2015). In addition to the high burden of hypertension in the Netherlands, the country is also dealing with both untreated and uncontrolled hypertension. While treatment and control of hypertension are critical in the prevention of serious complications including stroke and kidney disease (Sy et al., 2012), not every hypertensive has received treatment after being diagnosed. Among those diagnosed but untreated for hypertension, 21.9 % of men and 13.6% of women were eligible for treatment according

to Dutch guidelines (Schelleman et al., 2004). Especially among patients newly diagnosed with hypertension, 29% were eligible for pharmacotherapy but not treated within one year of diagnosis (van Wyk et al., 2005). The numbers indicate that under-treatment of hypertension affects nearly one third of hypertensive individuals in the Netherlands. Furthermore, among those who were treated pharmaceutically for hypertension, only 16.1% controlled their hypertension (diastolic blood pressure < 90 mmHg or systolic blood pressure < 160 mmHg) (Agyemang et al., 2015). Therefore, even if the hypertensive individuals take medication, there is still a high probability that their blood pressure may still be not well controlled.

1.1.2 Consequences of poor hypertension control

On one hand, high blood pressure is modifiable and studies have consistently shown that blood pressure control significantly reduces the occurrence of cardiovascular events and premature deaths (Luepker et al., 2006; Trialists'Collaboration, 2008). On the other hand, suboptimal blood pressure control is a major risk factor for cardiovascular events such as stroke, myocardial infarction, and target organ damage (Klungel et al., 1999; Mancia et al., 2013). Therefore, blood pressure must be controlled within the optimal level to reduce the disease burden brought about by hypertension.

1.2 Ethnic disparity in hypertension control

1.2.1 Ethnic diversity and collection of ethnicity data in the Netherlands

Similar to other European countries, the Netherlands has a growing immigrant population, especially in urban areas such as Amsterdam, Utrecht, Rotterdam, and the Hague (Beune, Haafkens, Schuster, & Bindels, 2006). Ethnic minority groups with non-European origins form approximately 10% of the total population of the Netherlands (Stronks et al., 2013). This number will increase to 20% in 2060 (Stoeldraijer & Garssen, 2011). The largest ethnic groups include Surinamese (South Asian Surinamese and Black Surinamese), Turkish, Moroccans, and Antilleans.

Statistics on ethnicity are not common in the Netherlands. It might be explained by legal prohibitions attached to data protection provisions and by a political reluctance to admit ethnic disparity (Simon, 2012). In the Netherlands, sensitive private information is highly protected. The regulation is particularly strict about this when collecting patients' ethnicity data. This is partly because of the ethnic cleansing committed during the Second World War in Europe. As a result, the collection of patients' ethnicity data is not complete, especially in primary care settings. Therefore, data on hypertension among minority groups is very limited which may cause difficulty in evaluating the curative effect among different ethnic minority groups. Compared with clinical practice guidelines in the USA and Canada, Dutch clinical practice guidelines give the least attention to ethnic differences in hypertension (Manna,

Bruijnzeels, Mokkink, & Berg, 2003). The Dutch guidelines contain only a few facts concerning ethnicity and made only one specific recommendation based on those facts.

1.2.2 Hypertension treatment and control among ethnic minorities

African-Surinamese immigrants from the former Dutch colony of Suriname and Ghanaians from West Africa are two major immigrant groups in the Netherlands (Beune et al., 2006). Studies have shown that hypertension prevalence appears to be higher among these two groups compared with their White Dutch counterparts (Agyemang et al., 2005; Agyemang, Bruijnzeels, & Owusu-Dabo, 2006; Agyemang et al., 2013; Brewster, van Montfrans, Oehlers, & Seedat, 2016). Furthermore, compared with White Dutch people, people of African origin get hypertension at a younger age and have a higher average blood pressure level (Bosworth et al., 2006; Brewster et al., 2016). It is shown that, among hypertensives, ethnic minority groups generally have higher hypertension awareness and receive more blood pressure lowering treatment than the White Dutch (Agyemang et al., 2015). However, uncontrolled high blood pressure still tends to be more common among ethnic minority groups than the White Dutch population, especially among Ghanaians, Black Surinamese, and South Asian Surinamese (Agyemang et al., 2005; Agyemang et al., 2010; Agyemang et al., 2013; Fernald et al., 2016). The HELIUS study shows that compared with Dutch men (53%) and women (61%), the control rate is significantly lower among Ghanaian men (26%) and women (45%), African-Surinamese men (30%) and women (45%), and South-Asian Surinamese men (43%) and women (47%) (Agyemang et al., 2015).

It is shown that eliminating the ethnic disparity in hypertension control will substantially reduce the number of deaths among people with African origin from both stroke and heart diseases (Fiscella & Holt, 2008).

1.2.3 Reasons for Ethnic disparity in hypertension control

The key factors underlying the unevenly distributed hypertension control rate are not clearly understood. One important factor might be that the adherence to treatment is lower among ethnic minority groups (Bosworth et al., 2006). The main treatment for hypertension includes long-term medication and lifestyle modification. Adherent patients have better health outcomes even if their medication is a placebo (McDermott, Schmitt, & Wallner, 1997). According to studies in Western Europe and the USA, the adherence to hypertension treatment is poorer among ethnic minority groups (Agyemang et al., 2005; Charles, Good, Hanusa, Chang, & Whittle, 2003; Glynn, Murphy, Smith, Schroeder, & Fahey, 2010; Morgan, 1995). Furthermore, it is indicated that the efficacy of antihypertensive drugs is different in patients of African ethnicity (Brewster et al., 2006; Brewster & Seedat, 2013; Brewster et al., 2016). The poor hypertension control among ethnic minority groups may also be associated with their health beliefs and perceived discrimination during visits. Blacks have more concerns about medication and less knowledge about hypertension. They also reported more experiences of discrimination when receiving health care (Kressin, Orner, Manze, Glickman, & Berlowitz, 2010).

1.3 Project description and aims

Ethnic disparity in hypertension control refers to the phenomenon that among people who are under hypertension treatment, certain ethnic groups have significantly poorer hypertension control (Fiscella & Holt, 2008). Physicians are the people who interface with patients directly and offer professional guidance for controlling patients' hypertension. They can play the role of patient health educators to improve their patients' compliance by addressing the determinants of poor compliance among patients (Okken et al., 2008). The treatment provided by physicians and the interaction between physicians and patients are both among the most important contributors to the outcome of hypertension control. By assessing their perceptions about ethnic disparity in hypertension control, it will help in either understanding the reasons for ethnic disparity in hypertension control or designing strategies to tackle this issue. Therefore, we designed this project to assess Dutch health professionals' perceptions about ethnic disparity in hypertension control as well as the merits of collecting patient ethnicity data. The three specific aims are:

- Aim 1: Discern health professionals' views about the merits of collecting patient ethnicity data.
- Aim 2: Evaluate the perceptions of health professionals regarding the presence and underlying sources of ethnic disparities in hypertension control as well as strategies to eliminate ethnic disparities in hypertension control.

- Aim 3: Explore the personal characteristics associated with attitudes toward data collection and ethnic disparities in hypertension control, as well as the reasons behind them.

2. Methods

This was a mixed-methods study that applied both quantitative and qualitative data collection techniques. It had been indicated that integration of quantitative and qualitative methods permits a more complete and synergistic utilization of data, and therefore yields greater insight (Wisdom & Creswell, 2013). Through incorporating online surveys with interviews, we gained a more comprehensive and complete understanding of the research question. In general, the online survey was to assess health professionals' knowledge, attitudes, and perceptions about ethnic disparity in hypertension control, while interviews were used to probe the reasons behind their knowledge, attitudes, and perceptions.

2.1 Study setting

This study was conducted in Randstad, 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. It is a dynamic metropolitan region where 8.1 million people—nearly half of the country's population—work and live (Manshanden & Koops, 2017). All the participants for both the online survey and the interviews in this study were recruited from this area. The reason Randstad was chosen as the study site was because it consists of the four largest cities in the Netherlands and attracts many ethnic minorities to live and work there compared with the rest of the Netherlands. For example, in Amsterdam, only 47.5% of the

population is White Dutch according to 2011 data (voor de Statistiek, 2011). In the Hague, the proportion of White Dutch is 48% (Den Haag, 2011), while in the Netherlands, 79.3% of the total population is White Dutch (voor de Statistiek, 2011). Therefore, the ethnic disparity in hypertension control should be a bigger problem in this area than other areas in the Netherlands.

2.2 Participants

Eligibility criteria for participants: health professionals currently practicing in the Randstad and treating hypertensive patients. In the specific context of the Netherlands, this includes general practitioners, nurse practitioners, internists, and cardiologists. Health professionals who did not treat hypertensives were excluded from this study. Participants differ in gender, age, professional background, ethnicity, type of practice, years in practice after graduation, and whether their patients are ethnically diverse. Although we are studying ethnic disparity in hypertension control, we do not restrict our participants to only health professionals who have ethnically diverse patients. The reason is that whether their patients are currently ethnically diverse or not, as health professionals who treat hypertensives, the awareness of this issue should be basic knowledge for them to have. Therefore, it is still important to assess the perception of all health professionals who treat hypertensives regardless of the ethnic diversity of their patients.

2.3 Procedures

2.3.1 Recruitment

2.3.1.1 For Online Survey

We could not obtain the list of Dutch health professionals with their phone numbers or email addresses because of strict privacy rule. Therefore, all the potential participants were recruited through the network of Duke Kunshan University's collaborators in the Amsterdam Institute for Global Health Development (AIGHD) instead. Constrained by limited resources and time, we used "snowball sampling," which is a nonprobability sampling technique where existing study participants introduce their acquaintances who meet the study inclusion criteria to the study, and which uses convenient sampling instead of random sampling (Goodman, 1961). After the potential participants were introduced by our collaborators, they received an email consisting of an invitation letter with an embedded link to the questionnaire. The data was collected through Qualtrics, an online data collection platform supported by both Duke University and Duke Kunshan University. A reminder email was sent out 3 weeks later, and a final reminder letter was sent out 5 weeks later to all the participants. It was infeasible to send the reminder letter targeting non-respondents because participants' individual email addresses were not recorded in this study due to confidentiality considerations.

Serving also as the informed consent form, the first part of the web-based questionnaire was an information page describing the aims of the study, the contents of the questionnaire, the research team, and the contact information. On both the first part of the email and the information page prior to the web-based questionnaire, it was stated clearly that the questionnaire was anonymous and respondents were free to quit prematurely or skip any questions while completing the questionnaire. However, if a respondent quit halfway, those responses would not be recorded. Agreement to participate was confirmed by the automatic return of the confidential questionnaire after it was completed. However, reasons for non-response were not available in this study.

Since only forty-eight responses were recorded by 13th November, we decided to provide incentives for potential participants in order to increase the number of responses. It is indicated that a small amount of monetary incentive produced a higher response rate than mailings without an incentive (James & Bolstein, 1990). After getting the approval from IRB at Duke Kunshan University, we offered participants who completed the survey 5-Euro digital gift cards from www.bol.com, a popular online shopping website. This was implemented after 13th November. We added one question in the survey asking for respondents' email addresses for accepting the digital gift cards. After receiving the responses, we sent the gift cards to the email addresses. The email addresses were not identifiable and only the two main investigators had access to them. By 15th December when survey was closed, we had received thirty additional valid responses.

2.3.1.2 For Interviews

The potential interviewees were introduced by collaborators in AIGHD and approached through email as stated above. They received an email containing the information page as well as asking their willingness to participant in this interview. If they agreed to participate, we would meet and conduct the interviews at the place they preferred, including their offices, coffee shops, or their homes. Two interviews were conducted through Skype, a popular video-chat software, due to schedule conflicts. The rest of the eleven interviews were all done face-to-face. Before the interview started, all participants gave their written informed consent and were asked about their willingness to be recorded. After getting their approval, the interviews were recorded. The recordings were saved for the purpose of research need. Only two primary investigators had access to the recordings. All original recordings would be destroyed after all research activities were finished.

2.3.2 Pilot study

The pilot testing for both the survey and interview was conducted among a group of hypertension experts two weeks before the invitation letter was sent out. This group consisted of six health professionals who satisfied the inclusion criteria. They were also asked to time how long would it take them to complete the survey. According to their feedback on the wording, formatting, and other aspects, we made adjustments to the survey.

For pilot testing of interviews, I conducted the interview with three of the group members. Based on their feedback, two adjustments were made to the structure of the interviews to reduce the confusion of the question or make the questions more clear to them, and to control the timing of the interview.

2.3.3 Survey development

All recruited health professionals were invited to complete a 20-item online questionnaire. The online survey was in English. The questionnaire was modified from an instrument originally developed to evaluate cardiologist's views on ethnic disparity in cardiology care (Lurie et al., 2005). The original instrument was developed based on a 1999 Kaiser Family Foundation survey that assessed the knowledge and attitudes of physicians (Lillie-Blanton, Brodie, Rowland, Altman, & McIntosh, 2000). This instrument was reviewed by external researchers and pretested later to ensure the validity. This instrument was also used in other studies assessing primary-care clinicians' perceptions of racial disparities in diabetes care as well as hypertension care in the USA (Kendrick, Nuccio, Leiferman, & Sauaia, 2015; Sequist, Ayanian, Marshall, Fitzmaurice, & Safran, 2008). In both studies, this instrument was shown to be successful in identifying the health professionals' awareness of ethnic disparity and views on the underlying sources of such ethnic disparity. Adjustments were made to this instrument based on our study aims.

The 20-item online questionnaire in this study includes 5 items asking about health professionals' perceptions regarding the following: collection of ethnicity data,

their awareness of ethnic disparity in hypertension control in different circumstances, perceived contributors of ethnic disparity in hypertension control, the effectiveness of four strategies, and the ethnic-specific education they received to address ethnic disparity in hypertension control. Four-point scale options were applied for each question, from "Yes, definitely" to "No, definitely not," from "Great deal" to "Not at all," and from "Very effective" to "Not effective at all." The rest of the items inquire about the characteristics of the respondents themselves as well as their practice, including health professionals' age, gender, ethnicity, professional background, years after graduation, type of practice, and whether they think their patients were ethnically diverse.

2.3.4 Interview guide development

Interviews were conducted in English. All the interview questions were linked to the online questionnaire items, aiming to probe the reasons for each question and response from the online questionnaire. The interview included six domains: (a) experience of ethnic disparity in hypertension control and the reasons; (b) situation of ethnic disparity in hypertension control in different parts of the Netherlands and the reasons for that; (c) how collecting patients' ethnicity data helps reduce ethnic disparity in hypertension control; (d) how health professionals and patients contribute to ethnic disparity in hypertension control; (e) strategies to reduce ethnic disparity in hypertension control; and (f) attitudes towards ethnic-specific education received by health professionals.

2.3.5 Analysis

2.3.5.1 Quantitative analysis

Eighty-one questionnaires were collected. Among them, four incomplete questionnaires with more than half of the questions unanswered were discarded to avoid any bias. The answers to the questions were exported from Qualtrics using Excel sheets and imported into Stata.

The four-point scale was applied to the five questions in the survey asking health professionals' perceptions regarding the collection of ethnicity data, their awareness of ethnic disparity in hypertension control in different circumstances, perceived contributors of ethnic disparity in hypertension control, as well as the effectiveness of four strategies and the ethnic-specific education they received to address ethnic disparity in hypertension control. When the association between personal characteristics and health professionals' attitudes was explored, we determined the five research questions. These five questions were dichotomized as "Yes, definitely" or "Yes, probably" versus "No, probably not" or "No, definitely not"; "Great deal" or "Some" versus "A little" or "Not at all"; and "Very effective" or "Somewhat effective" versus "Not very effective" or "Not effective at all," to avoid any problems with small cell sizes.

We also dichotomized several demographic questions concerning professional background and health professionals' ethnicity, as well as whether patients were ethnically diverse. Professional background was dichotomized into "General practitioner" versus "Others." Health professionals' ethnicity was dichotomized into

“White Dutch” versus “Others.” Patients’ ethnic diversity was dichotomized into “Yes” versus “No.”

Descriptive analysis was conducted to first provide summaries of the responses. Next, we summarized the counts of occurrences for each response. Then, we examined the data to look for associations between five survey questions and the seven characteristics of respondents. Since all the outcome variables are ordinal, the distribution of responses from different groups was compared using Chi-square tests. Logistic regression was also applied to analyze the personal or practice level predictors of health professionals’ attitudes towards collecting ethnicity information. $P < 0.05$ was considered statistically significant. All analysis was conducted using Stata/SE 15.0.

2.3.5.2 Qualitative analysis

Interviews were recorded after acquiring interviewees' approval. The recording was then transcribed and imported into NVivo for analysis. Thematic networks, as an analytic tool, was applied in this study. Overall, 6 steps were conducted in analyzing the transcripts, including coding materials, identifying themes, constructing thematic networks, describing and exploring thematic networks, summarizing thematic networks, and interpreting patterns. The first two steps were conducted by two investigators at the same time to ensure the coding and themes were in consensus.

All the transcripts were coded and interpreted with the help of NVivo 11.

2.3.6 Ethical approval

All study procedures were approved by the institutional review board at Duke Kunshan University. Because our participants are all health professionals and it is a simple study that poses no risk to the respondents, we were not required to gain approval from the review board in the Netherlands.

3. Results

3.1 Online questionnaire

3.1.1 Demographics of the Health Professionals Surveyed

We received 77 valid responses from health professionals. The summary of characteristics of these 77 participants can be seen in Table 1. The majority of respondents were general practitioners (83.8%), were female (58.4%), and were predominantly White Dutch (77.6%). The providers had primarily graduated 11 to 20 years ago (35.1%), had ethnically diverse patients (79.2%, including 67.5% "Yes, definitely" and 11.7% "Yes, probably"), and were practicing in groups (59.7%).

Table 1: Characteristics of questionnaire respondents N = 77

	Frequency (%)
Background	
General practitioner	62 (80.5)
Nurse practitioner or office assistant	7 (9.1)
Cardiologist or others	8 (10.4)
Male	32 (41.6)
Age	
⩽ 35	17 (22.1)
35 to 50	29 (37.7)
⩾ 50	31 (40.3)
Ethnicity	
White Dutch	59 (76.6)
African origin	2 (2.6)
Asian origin	10 (13.0)

Others	6 (7.8)
Years since graduation	
< 11	23 (29.9)
11 to 20	27 (35.1)
20 to 27	10 (13.0)
> 27	14 (18.2)
Do not have such a medical degree	3 (3.9)
Ethnically diverse patients	
Yes, definitely	52 (67.5)
Yes, probably	9 (11.7)
No, probably not	12 (15.6)
No, definitely not	4 (5.2)
Type of practice	
Solo	12 (15.6)
Dual	19 (24.7)
Group	46 (59.7)

3.1.2 Attitudes

As shown in Figure 1, all of the respondents reported that the collection of patients' ethnicity data was definitely or probably important in ensuring the delivery of high-quality hypertension care for all patients. Among them, around 65.8% of the respondents reported it was definitely important to collect patients' ethnicity data. Among those participants who reported their patients as ethnically diverse (Figure 2), all of the respondents reported that the collection of patients' ethnicity data was important. Similarly, around 70% of the participants reported it was definitely important to collect ethnicity data.

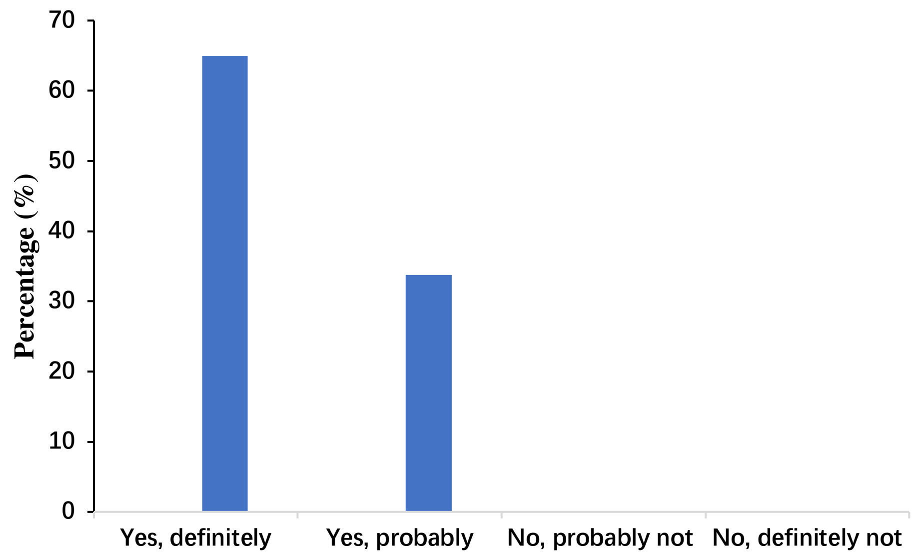

Figure 1. Proportion of health professionals responding to the importance of collecting patients' ethnicity data.

*Note: All participants were included (n=77). Data was missing for 1 participant.

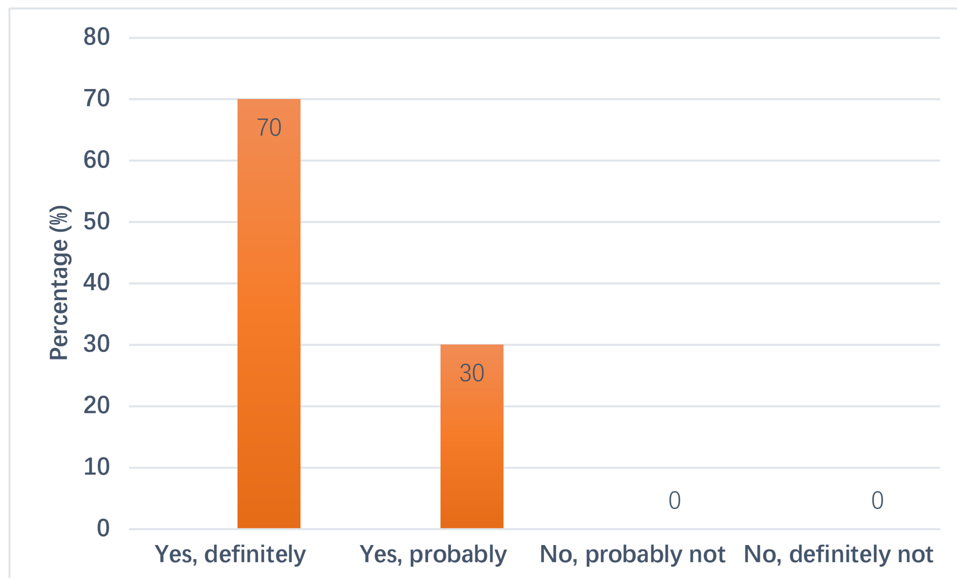

Figure 2. Proportion of health professionals who reported their patients as ethnically diverse responding to the importance of collecting patients' ethnicity data.

*Note: Only participants who reported their patients as ethnically diverse were included (n=61). Data was missing for 1 participant.

As shown in Figure 3, the vast majority of participants reported that ethnic disparity is a problem in the Netherlands health system (83.1%; 95% confidence interval CI [0.729, 0.907]), and in Amsterdam or The Hague (83.6%; 95% CI [0.730, 0.912]). However, significantly fewer participants (63.2%; 95% CI [0.513, 0.739]) reported that ethnic disparity is a problem in their health centers. Furthermore, even fewer participants (57.3%; 95% CI [0.454, 0.687]) reported the existence of ethnic disparity among the patients they treated compared with those who reported the existence of ethnic disparity in Amsterdam or The Hague. This shows that as the health care setting became increasingly personal, fewer participants acknowledged that ethnic disparity in hypertension was a problem.

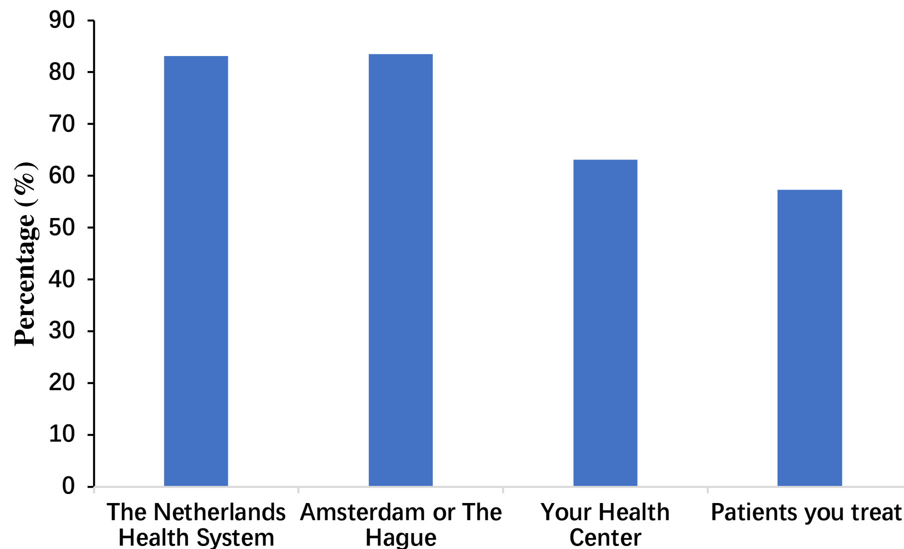

Figure 3. Proportion of health professionals responding that ethnic disparity in hypertension control is a problem in the circumstances above.

*Note: All participants were included (n=77). Data were missing for a small number of participants who did not answer the questions regarding Amsterdam or The Hague (n = 4), your health center (n = 1), or patients personally treated (n = 2).

As shown in the previous finding, significantly fewer participants reported the existence of ethnic disparity in hypertension control among their own patients, compared with those who reported the existence of ethnic disparity in hypertension control in Amsterdam more generally. The finding was similar among health professionals who reported their patients as ethnically diverse (Figure 3). Around 78.7% (95% CI [0.663, 0.881]) of the health professionals reported the existence of ethnic disparity in hypertension control in the Netherlands health system. Nearly 82.8% (95% CI [0.706, 0.914]) of the health professionals agreed that there was ethnic disparity in hypertension control in Amsterdam or The Hague, while 66.7% (95% CI [0.533, 0.783]) of

health professionals reported it existed in their own clinic, and significantly fewer (57.6%; 95% CI [0.441, 0.704]) thought it existed among their own patients. This shows that slightly fewer participants acknowledged that ethnic disparity in hypertension control is a problem when the health care setting became increasingly personal, such as within their clinic, and even more so among their own patients.

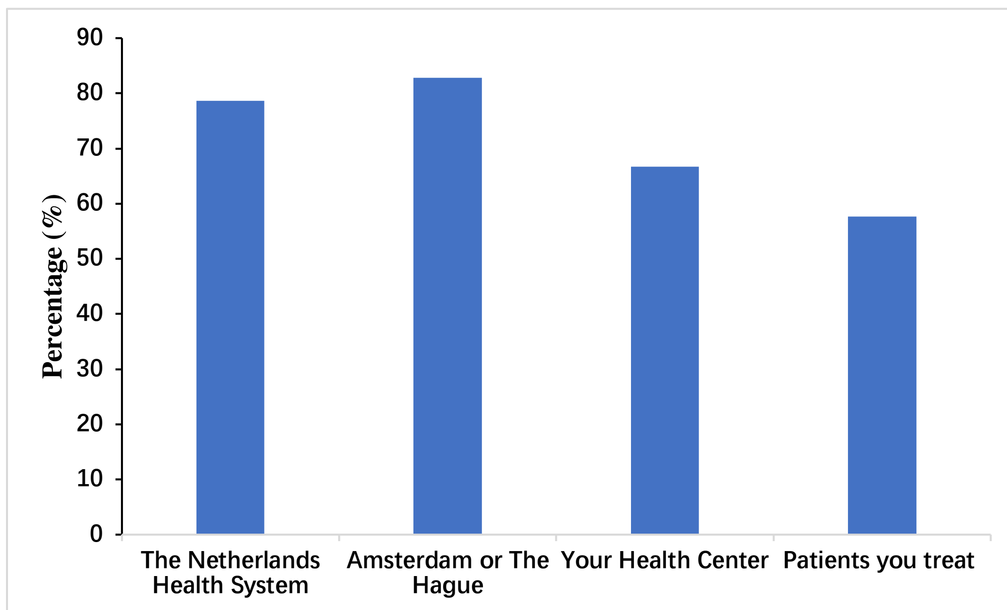

Figure 4. Proportion of health professionals responding that ethnic disparity in hypertension control is a problem among those with ethnically diverse patients.

*Note: Only participants who reported their patients as ethnically diverse were included (n=61). Data were missing for a small number of participants who did not respond to questions regarding Amsterdam or The Hague (n = 3), your health center (n = 1), or patients personally treated (n = 2).

As shown along the vertical axis of Figure 4, the factors contributing to ethnicity-based differences in hypertension care were grouped into two categories. The upper

grouping consists of patient-related factors while the lower group contains health professional-related factors. Participants who responded to the question concerning factors contributing to ethnic disparity in hypertension control tended to emphasize the importance of patient-related factors more than health professional-related factors (Figure 4). Among patient-related factors, patients' health behavior was the one most frequently cited (67.5%) to explain the ethnic disparity in hypertension control, while among health professional-related factors, general miscommunication with patients was most commonly cited (45.5%). This trend was similar among participants who reported their patients as ethnically diverse (Figure 6).

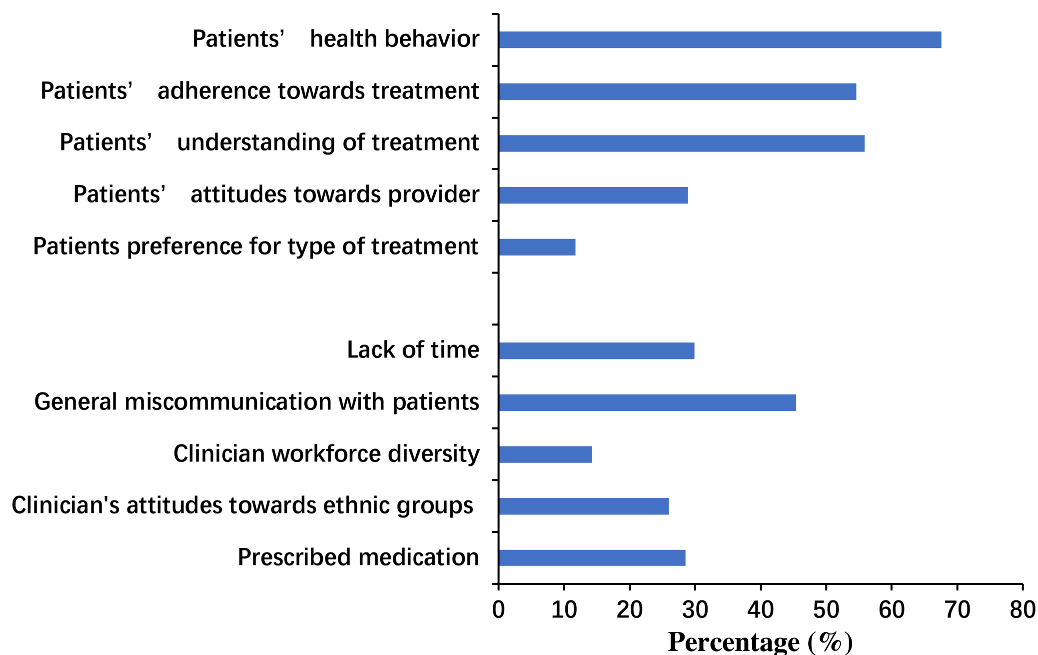

Figure 5. Proportion of health professionals reporting patients' factors and clinician' factors contributing a "Great deal" to ethnic disparity in hypertension control.

*Note: All participants were included (n=77). Patients' factors were listed in upper panel, and health professionals' factors were listed in the lower panel of the graph. Data were missing for 1 participant who did not respond to the question regarding patients' attitudes towards the provider.

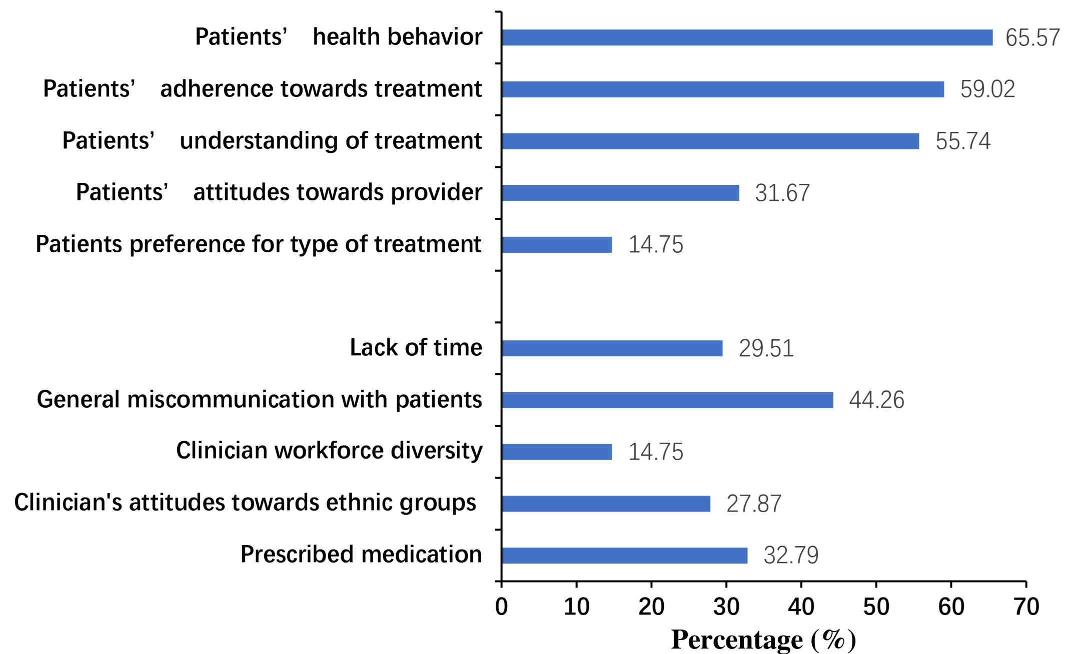

Figure 6. Proportion of health professionals reporting patients' factors and clinician' factors contributing "Great deal" to ethnic disparity in hypertension control.

*Note: Only participants who reported their patients as ethnically diverse were included (n=61). Patients' factors were listed in upper panel, and health professionals' factors were listed in the lower panel of the graph. Data were missing for 1 participant who did not respond to the question regarding patients' attitudes towards the provider.

Health professionals were asked to grade the effectiveness of four strategies to reduce ethnic disparity in hypertension control (see Figure 5). The four strategies included a non-targeted hypertension care improvement program, a hypertension care

improvement program with a specific focus on ethnic minorities, improving health professionals' awareness of ethnic disparity in hypertension control, and promoting the cultural competency of health professionals. As shown in Figure 5, the non-targeted hypertension care improvement program was least likely to be considered as "Very effective" (7.9%). The hypertension care improvement program with a specific focus on ethnic minorities was more likely to be considered "Very effective" compared with the non-targeted one (35.1% versus 7.9%). The program most frequently cited as "Very effective" was the one focused on improving health professionals' awareness of ethnic disparity in hypertension control (50.7%). The distribution was similar among participants who reported their patients as ethnically diverse (Figure 8).

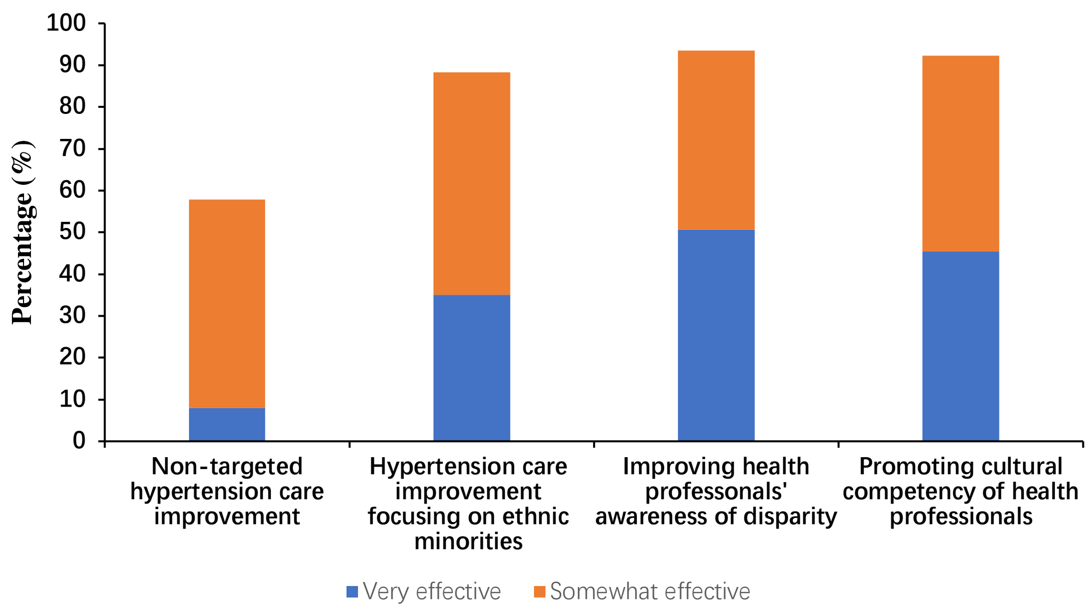

Figure 7. Proportion of health professionals responding to the effectiveness of four strategies to reduce ethnic disparity in hypertension control.

*Note: All participants were included (n=77). Data were missing for 1 participant who did not respond to Non-targeted hypertension care improvement program.

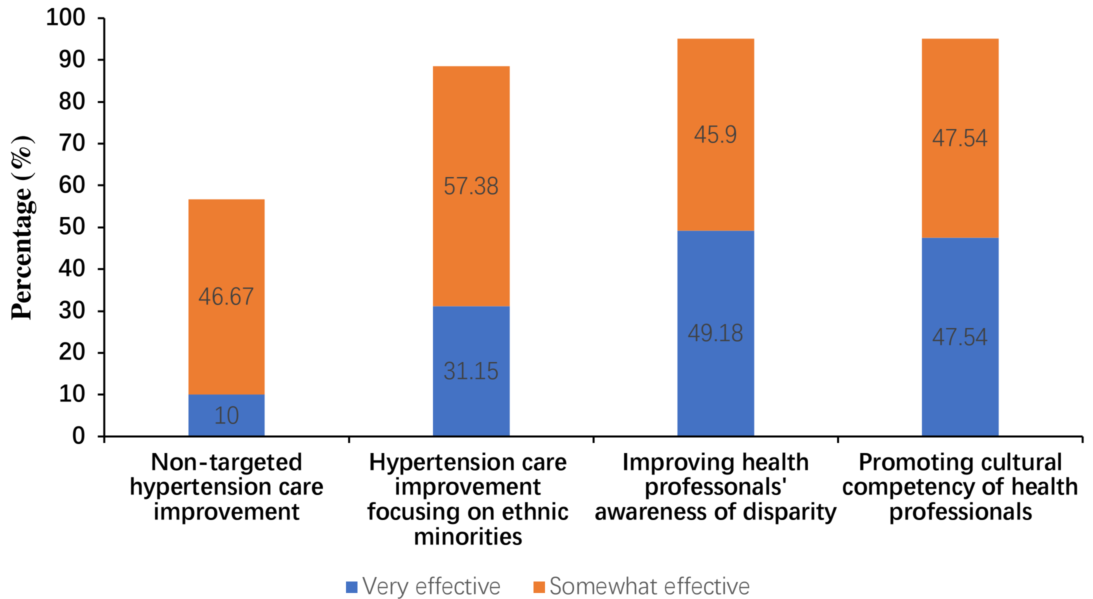

Figure 8. Proportion of health professionals responding to the effectiveness of four strategies to reduce ethnic disparity in hypertension control.

*Note: Only participants who reported their patients as ethnically diverse were included (n=61). Data were missing for 1 participant who did not respond to Non-targeted hypertension care improvement program.

As shown in Figure 6, first of all, 7.9% of the participants reported that they had never received ethnic-specific education. Among those who received ethnic-specific training, the vast majority (88.2%) of participants had positive attitudes towards the ethnic-specific training they received in reducing ethnic disparity in hypertension control. Among them, 38.2% thought it was definitely helpful and 50.0% reported that it

was probably helpful. The distribution was still similar among those participants who reported their patients as ethnically diverse (Figure 10).

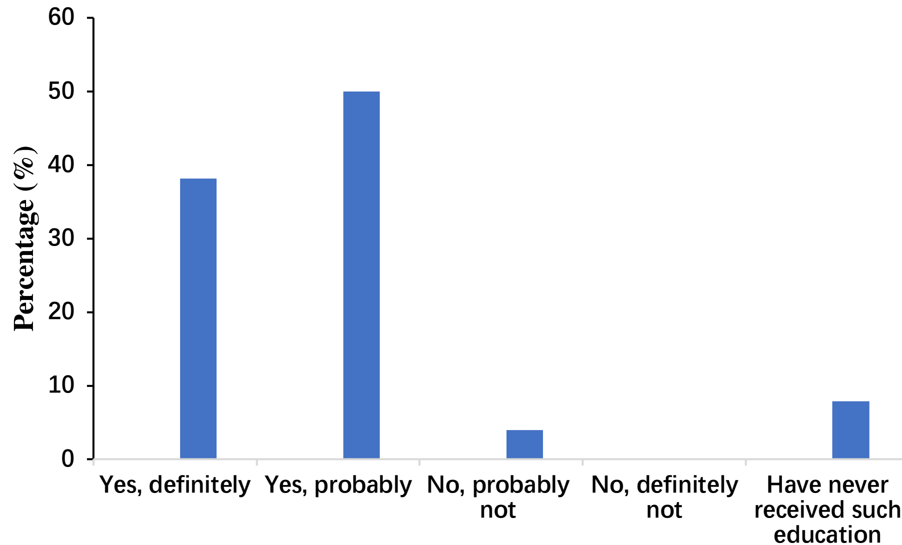

Figure 9. Proportion of health professionals responding to the effectiveness of ethnic-specific education they received in reducing ethnic disparity in hypertension control.

*Note: All participants were included (n=77). Data were missing for 1 participant.

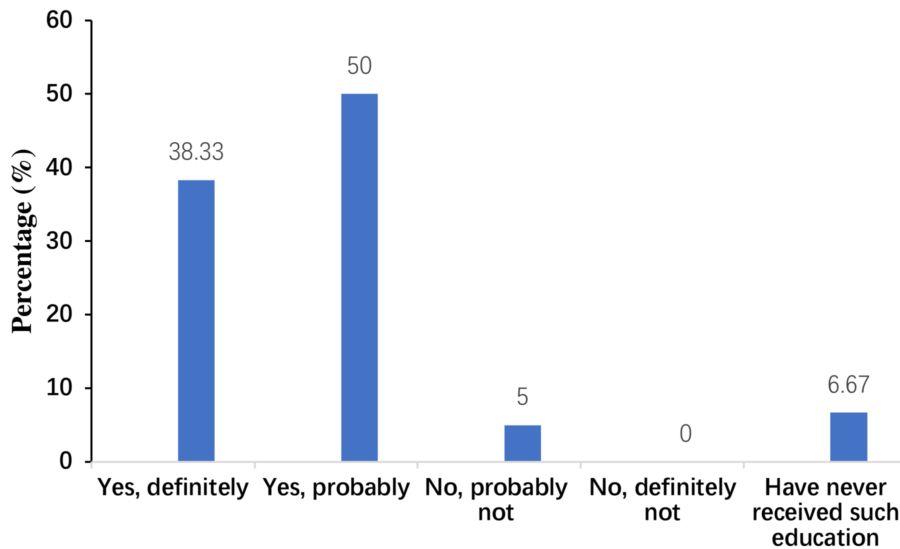

Figure 10. Proportion of health professionals responding to the effectiveness of ethnic-specific education they received in reducing ethnic disparity in hypertension control.

*Note: Only participants who reported their patients as ethnically diverse were included (n=61). Data were missing for 1 participant.

3.1.3 Factors associated with health professionals' attitudes towards

3.1.3.1 Collecting patients' ethnicity

As shown in Figure 1, all 77 participants agreed that it was important to collect patients' ethnicity in order to reduce ethnic disparity in hypertension control. No personal characteristic was found significantly associated with health professionals' attitudes towards the importance of collecting ethnicity data.

3.1.3.2 Existence of ethnic disparity in hypertension control in four circumstances

Patients' ethnic diversity was found to be associated with health professionals' perception about the existence of ethnic disparity in hypertension control in the Netherlands using the Fisher exact test (P = 0.036). Health professionals whose patients were less ethnically diverse were more likely to support the existence of ethnic disparity in the Netherlands.

3.1.3.3 Factors contributing to ethnic disparity in hypertension control

First, gender and age were found to be associated with health professionals' attitudes towards the question "How much does clinician's attitudes towards ethnic groups contribute to ethnic disparity in hypertension control" using the Fisher exact test (P = 0.022; P = 0.003). Males were more likely than females to respond to "How much does clinician's attitudes towards ethnic groups contribute to ethnic disparity in hypertension control." After doing multiple tests and adjusting P to 0.016 accordingly, it was found that health professionals who were under 35 were more likely to choose clinician's attitudes towards ethnic groups as a contributor (P = 0.002).

Second, White Dutch health professionals were found less likely to choose "clinician workforce diversity" as a contributor to ethnic disparity in hypertension control (P = 0.014).

Third, general practitioners were found more likely to report lack of time as a contributor to ethnic disparity in hypertension control than other health professionals (P = 0.009).

3.1.3.4 Effectiveness of four strategies

Female respondents were found more likely to report the programs to improve cultural competency as effective than male respondents (P = 0.042).

3.1.3.5 Effectiveness of ethnic-specific training

No personal characteristics were found statistically significant with health professionals' attitudes towards the effectiveness of ethnic-specific training.

3.2 In-depth interview

3.2.1 Sample characteristics

We conducted 13 interviews in total. Their characteristics can be seen in Table 6. The majority of the interviewees were general practitioners (75.0%), female (53.9%), aged no more than 35 years or 35 to 50 (46.2%), and were predominantly White Dutch (92.3%). The providers had primarily graduated less than 11 years ago (61.5%), had ethnically diverse patients (69.2%, including 53.9% answering "Yes, definitely" and 15.4% "Yes, probably"), and were practicing in groups (61.5%).

Table 2: Characteristics of interview respondents

	Frequency (%)

Background	
General practitioner	8(66.7)
Nurse practitioner or office assistant	2(16.7)
Cardiologist or others	2(16.7)
Male	6(50.0)
Age	
No more than 35	5(46.7)
35 to 50	6(50.0)
More than 50	1(8.3)
Ethnicity	
White Dutch	11(91.7)
African origin	0(0)
Asian origin	0(0)
Others	1(8.3)
Years since graduation	
< 11	7(58.3)
11 to 20	3(25.0)
20 to 27	2(16.7)
> 27	0(0)
Do not have such a medical degree	0(0)
Ethnically diverse patients	
Yes, definitely	6(50.0)
Yes, probably	2(16.7)
No, probably not	3(25.0)
No, definitely not	1(8.3)
Type of practice	
Solo	1(8.3)
Dual	4(33.3)
Group	7(58.3)

Note: one interviewee did not respond to the questionnaire.

3.2.2 Awareness of ethnic disparity in hypertension control and the reasons

Eleven out of thirteen interviewees reported they were aware of ethnic disparity in hypertension control, although three of them mentioned that their own patients were not ethnically diverse. These three interviewees further explained that they were aware of this problem because of their research experience or former experience when working at a clinic with more patients from different ethnic groups. One responded, "I do not know from this practice, because I just do not have them but I know it from the hospital (where I worked as a trainee)." When asked further about which minority group had the biggest difficulty in controlling blood pressure, they all mentioned African patients including African American as well as African Surinamese. Responses included, "Especially in black African patients," and "Mostly the black people, like African American and Surinamese."

When these eleven interviewees were asked what the reasons were that contributed to the difficulty of ethnic minorities in controlling blood pressure (Appendix B, 4), they generally gave four categories of reasons (Table 7). First, six out of eleven interviewees mentioned poor adherence to medication, which was related to patients' lack of knowledge of hypertension, especially poor understanding of the importance of taking medication routinely even if they could not feel hypertension. Responses

included, “They prefer not to take any medication,” and “It is lack of understanding that medication can be taken to prevent getting a worse condition.” Second was the genetic reason. Five interviewees argued that it was also because people from different ethnic groups had different reactions to medication: “Different ethnicities have difference reaction to medication.” Third, two out of those eleven interviewees specifically mentioned the unhealthy lifestyle and diet among some ethnic groups, including lack of exercise and high salt intake: “They eat a lot of salt and they do not move. So their whole lifestyle are not so good.” Finally, one interviewee mentioned that the language barrier was a big problem. Because of the language barrier, it was difficult for him to effectively provide lifestyle advice, stress the importance of medication adherence, and motivate the patients: “And also lifestyle advices were more difficult to explain, to implement for those patients.”

Table 3: Reasons for difficulty among ethnic groups in controlling hypertension

Reasons for the difficulty among ethnic groups in controlling hypertension	Quotation example	Interviewees mentioned/total interviewees with awareness
Poor adherence to medication	*“They prefer not to take any medication.”*	6/11
Genetic reasons	*“Different ethnicities have difference reaction to medication.”*	5/11

Unhealthy lifestyle and diet	*"They eat a lot of salt and they do not move. So their whole lifestyle are not so good."*	2/11
Language barrier	*And also lifestyle advices wee more difficult to explain, to implement for those patients."*	1/11

However, two interviewees admitted that they were not aware of this problem before and therefore could not name any ethnic minority groups that had more difficulty in controlling their blood pressure. One of them was a general practitioner and the other was a nurse. When asked about the reasons why they were not aware of this problem, the general practitioner argued that because most of the hypertensives were treated by nurses, she did not treat many hypertensives: "We have nurses in the practice and most hypertension patients they are seen by the nurse." The nurse, however, said she was not aware of the problem because she never knew that the difficulty of controlling hypertension might differ among different ethnic groups and she never paid attention to it: "I wasn't aware of noticing it. But now you are saying it to me, I think I should be aware." This might show the important role of nurses if we want to reduce the ethnic disparity in hypertension control because they work with patients most, and their awareness of this problem might be lower than other health professionals.

3.2.3 Reasons for supporting collecting ethnicity data

All of the thirteen interviewees in this study supported collecting ethnicity data during daily practice and thought it was helpful in reducing ethnic disparity in hypertension control (Appendix B, 1). The three main reasons mentioned by interviewees were listed in Table 8. When asked how it would help reduce ethnic disparity in hypertension control by collecting patients' ethnicity data, ten of them mentioned that by collecting patients' ethnicity data, health professionals can better assess their risk of getting cardiovascular diseases and decide whether to treat them earlier or what may be the best treatment for them. Responses included the following: "Because when people say I belong to which ethnicity, then it means culturally they usually follow the path of the dietary habits and the religious habits around it, which are also related to their lifestyle"; "Maybe if you ask for their ethnicity, you would give them better medication"; and, "It can help by selecting the appropriate drugs basically."

Three interviewees mentioned that it could also help by raising both patients' and health professionals' awareness of ethnic disparity in hypertension. They responded: "Because when you ask, people are more aware that it is a problem," and "It is like an investment in patients. When you are more interested in what background they are, then you will treat those patients better."

There was also one interviewee who mentioned that collecting patients' ethnicity would help health professionals to approach patients from the same ethnic background

as a group, which may work better than approaching them individually: "Collecting patients' data may help you approach them as a group."

Table 4: Reasons for supporting collecting patients' ethnicity

Reasons for supporting collecting ethnicity	Quotation example	Interviewees mentioned/ total interviewees
Help better assess patients risk and make better treatment plan	*"It can help by selecting the appropriate drugs basically."*	10/13
Help raise both patients' and health professionals' awareness of ethnic disparity in hypertension	*"Because when you ask, people are more aware that it is a problem."*	3/13
Help health professionals to approach patients from the same ethnic background as a group	*"Collecting patients' data may help you approach them as a group."*	1/13

3.2.4 How ethnic disparity in hypertension control differs

All the thirteen interviewees agreed that the severity of ethnic disparity in hypertension control differs among the four circumstances (Appendix B, 3). All of them thought that ethnic disparity in hypertension control was a bigger problem in Amsterdam or other big cities in the Netherlands, where the population was more ethnically diverse compared with other areas. Their responses included the following: "Ethnicity is a problem in the major cities in the Netherlands, like Amsterdam, The

Hague, Utrecht, Rotterdam," and "I think in Amsterdam, well in Holland, we have lots of ethnic diversity, but I think in Amsterdam there is over 160 different nationalities. So in Amsterdam you are more likely to come across people with different ethnicity."

Three interviewees reported that the health professionals working there were another factor contributing to the differences of ethnic disparity in hypertension control between practices: "General practitioners have different ideas about what should be normal blood pressure"; "Since I am a general practitioner with a special interest in CVD, we are ahead of other practices;" and "I try to be at least aware of this problem, but maybe some practices they are not really aware. So then the severity is higher."

3.2.5 Factors contributing to ethnic disparity in hypertension control

All the interviewees mentioned that both patients and health professionals contributed a lot to ethnic disparity in hypertension control (Appendix B, 5). After being asked to choose which contributed to ethnic disparity more, seven of them chose patients and four chose health professionals. The other two thought it was the interaction between these two parties and would not choose one over the other: "It is always interaction between two people so I would not say it is on either side."

People who chose patients as the most important contributors argued that their lifestyle and medication adherence played a bigger role in controlling hypertension than what health professionals could do: "I think the impact of their lifestyle is larger than the impact of what the doctors can do at the moment;" "At the end the patients have to take the pills"; "Because the lifestyle has such profound influence and also patient has most

influence on adherence as well"; and "I think it is more important for patients themselves to become aware."

The main reason for those who chose health professionals as the more critical factor was because health professionals had expertise and therefore should take more responsibility: "I think the physician side is the biggest part. It is also their responsibility to give awareness to the patients"; "I think the doctor side is easier to tackle"; and "I think as a doctor, we should be more aware of these factors so that we more effectively help the patients."

3.2.6 Recommendation of strategies to reduce ethnic disparity

Seven strategies were reported by 13 interviewees that might help reduce ethnic disparity in hypertension control (Table 9). First, the most frequently mentioned one was updating the guideline used by general practitioners. The different treatment choices for different ethnic minorities should be included in the guideline. Respondents indicated the following: "Right now, the different recommendation in guideline is only for the black people"; and "We have to make different guidelines for these different groups." Three of the seven interviewees specifically emphasized the importance of conducting more research about the best treatment for different ethnic groups and then including it in the guideline: "So I think more research to (this problem) is also important;" and "Just according to the research what factors may contribute to the ethnic difference in hypertension control and include it in the guideline so that the physician could be aware of it."

The second most frequently cited strategy was more training for health professionals on how to better communicate with patients, especially to develop communications skills for educating patients as well as asking patients' ethnicity: "I think we should be trained to have a conversation with the patient;" "Another thing is in the way we educate patients, we can use different words to make it more acceptable for the patients"; and "It is really about the interaction with patients much more important than just giving pills."

Third, five interviewees proposed training programs targeting nurses since they provided most of the hypertension care and had more time than physicians. Another reason was that the awareness of ethnic disparity in hypertension control may be lower among nurses than physicians. Responses included the following: "I think the knowledge is there, only among nurses, their knowledge might be less"; "The practice nurse should know about this"; "If we have ethnic programs that are more tailored to different ethnic groups via these nurse, it can be very effective I think"; and, "But there is nurse, who has more time. And she should also be aware."

Fourth, four of the interviewees mentioned it was important to raise health professionals' awareness about ethnic disparity in hypertension control, especially for those who worked in big cities: "So the awareness around patients and the awareness around physician as well, to pay good attention to what ethnicity your patients is to treat it better. So that is what we could start"; and "That is a good idea (to improve

health professionals' awareness), especially in Amsterdam, because there are a lot of diversity there."

Fifth, three interviewees supported strategies that increased patients' social support by involving their family or a role model from their community: "I think it's important to involve role models, to involve the church. So more like cultural important people, specifically from their own culture"; and "So you involve in more people especially their family than just patient himself."

Sixth, two interviewees mentioned it might be convenient and useful to offer internet applications for health professionals to look up for different treatment schemes for patients from different ethnic groups: "It might be helpful to develop some apps or maybe internet applications where as a doctor I can go straight to hypertension treatment in Chinese people, for example"; and "I think it would help if physicians would have an automatic treatment system, where the information of different ethnicity is also involved."

Lastly, two other strategies were mentioned only. The first is that each health professional should be trained in both big cities and the countryside: "I think it is good that our training consisting of one year in the city and one year on the countryside, because the countryside is known for less ethnic diversity." The second strategy suggested was that it might help to build an evaluation system that evaluates health professionals' performance treating hypertensives from different ethnic groups: "I think if they do not do it well, they should get the discount on their salary."

Table 5: Strategies recommended by interviewees in reducing ethnic disparity in hypertension control

Strategies recommended	Quotation example	Interviewees mentioned/total number of interviewees
More research and update the guidelines accordingly	*"We have to make different guidelines for these different groups."*	7/13
Improve health professionals' communication skills	*"I think we should be trained to have a conversation with the patient."*	6/13
Training program targeting at nurses	*"If we have ethnic programs that are more tailored to different ethnic groups via these nurse, it can be very effective I think."*	5/13
Programs raising health professionals' awareness about ethnic disparity in hypertension control	*"That is a good idea (to improve health professionals' awareness), especially in Amsterdam, because there are a lot of diversity there."*	4/13
Increase patients' social support from family or community	*"So you involve in more people especially their family than just patient himself."*	3/13
Internet application for health professionals to look up for treatment guide	*"It might be helpful to develop some apps or maybe internet applications where as a doctor I can go straight to*	2/13

	hypertension treatment in Chinese people, for example."	
Each health professionals should be trained in both big cities and countryside.	*"I think it is good that our training consisting of one year in the city and one year on the countryside, because the countryside is known for less ethnic diversity."*	1/13
Build an evaluation system evaluating health professionals' performance	*"I think if they do not do it well, they should get the discount on their salary."*	1/13

3.2.7 Recommendation of strategies to ethnic-specific education for health professionals

All the interviewees reported that they had received very little ethnic-specific education and it was just about the awareness (Appendix B, 7): "Almost none. Only awareness. You should be aware of it, but then what should we do with them?" Also, all of them agreed that this education should be continuous for general practitioners starting from medical school to have a general idea and be open-minded, that they should receive more specific knowledge about treating hypertensives from different ethnic groups during training, and that they should continue learning it by selecting relevant elective courses after practicing. Responses included the following: "It should be continuous," and "You have to start as a medical student. Because not all the medical student will do the same specialization, then at least everyone has a little base. Then I

think since general practitioners treat a lot hypertensives so as a general practitioner, you should focus a lot on that.

Two interviewees emphasized that nurses should also receive such education: “But there is nurse, who has more time. And she should also be aware”; and “They see far more patients, it would be really good if they knew more about ethnic groups.”

One interviewee also mentioned that “it would be nice get presentation from doctors who are very experienced with treating those different ethnicities.”

4. Discussion

4.1 Summary of the findings

4.1.1 Health professionals' attitudes towards collecting ethnicity data

The findings of this study suggest that around 99.0% of health professionals agreed that it was important to collect patients' ethnicity to ensure the delivery of high-quality hypertension care for all patients. Also, health professionals who treat more ethnic minority groups would be more likely to support collecting patients' ethnicity. There are multiple reasons for health professionals' positive attitudes towards collecting patients' ethnicity. The most important reason might be that by collecting patients' ethnicity, health professionals would be able to better assess patients' risk and prescribe the drugs that work best for them, therefore avoiding the drugs that were shown to be ineffective on them.

Similar results were found among patients in previous studies. It was found that the large majority of patients agreed that health professionals should collect ethnicity information and use it to control ethnic disparity (David W. Baker, Hasnain-Wynia, Kandula, Thompson, & Brown, 2007; Pringle & Rothera, 1996). The feasibility and acceptance of collecting ethnicity information in primary care were also validated by several studies, calling for the implementation of collecting ethnicity information in general practice (David W Baker et al., 2006; Sangowawa & Bhopal, 2000).

4.1.2 Health professionals' attitudes towards existence of ethnic disparity in hypertension control in four circumstances

Our study results regarding differences in ethnic disparity among different settings are consistent with previous studies studying ethnic disparity in healthcare in the USA. These studies found a significantly larger amount of health professionals reporting the existence of ethnic disparity in hypertension control in the national setting than in their own clinics or among the patients they treated (Kendrick, Nuccio, Leiferman, & Sauaia, 2015; Sequist, Ayanian, Marshall, Fitzmaurice, & Safran, 2008;(Lurie et al., 2005). According to the interview, this might be partially explained by the fact that compared to health professionals practicing in big cities like Amsterdam, the health professionals practicing in other areas might not have that many patients from different ethnic groups. Therefore, the ethnic disparity in hypertension control among their patients was not as severe as it was in the Netherlands. However, the same result was found among health professionals who reported their patients as ethnically diverse (Figure 3). The reason for this finding may be that, as mentioned in the interview, these health professionals tended to believe they had higher awareness and performed better than other health professionals. It might also be due to the possibility that they did not see the ethnic disparity when it comes to their own cases or they are not willing to admit this even if they do notice that it happens in their practice. However, there is no ethnicity data collected in the Netherlands. Therefore, we are not able to evaluate ethnic disparity in hypertension control among their patients to confirm

this possibility. As a result, we cannot compare the real situation in their practice with their answers to validate the underlying reasons.

4.1.3 Health professionals' perceptions on contributors to ethnic disparity in hypertension control—more on patients or physicians

We also found that health professionals tended to cite patient-related factors as contributors to ethnic disparity in hypertension control more frequently than health professional-related factors. Similar results were found in a study assessing primary care providers' perceptions of ethnic disparity in hypertension control in the USA (Kendrick, Nuccio, Leiferman, & Sauaia, 2015). A similar pattern was found among the 13 interviewees in this study, for 53.8% chose patients as the largest contributor, and 30.8% chose health professionals. This result, to some extent, caters to the result in the last question in which more health professionals admit to the existence of ethnic disparity in hypertension control in other settings than in their own practice. This might indicate that if there is no guidance from outside, it is easy for them to see the general problem outside of their practice while ignoring the problem with themselves. According to the interview, for those who chose patients as the major contributor, they argued that it depended on the patients themselves whether they were able to adhere to medication and adjust their lifestyle to control their blood pressure. However, for those who selected health professionals as more critical, it might be due to thinking that health professionals are those who have more knowledge and resources and should therefore take the responsibility to assist patients so as to improve patients' awareness, adherence

to medication, and lifestyle changes. It appears that health professionals who place more responsibility on themselves are more introspective about their practice, and they might act more actively when working with patients, which might help reduce the ethnic disparity in hypertension. It might be interesting to compare the performance between health professionals who chose patients as the greater contributors and those who chose themselves as more critical.

4.1.4 Health professionals attitudes towards effectiveness of strategies in reducing ethnic disparity in hypertension control

Another finding in this study is that although the majority of health professionals place the responsibility for ethnic disparity on patients, more of them selected programs targeted at health professionals to improve their awareness of this problem as well as their cultural competency. Our finding is consistent with a previous study assessing primary care providers' perceptions of ethnic disparity in hypertension control in the USA (Kendrick et al., 2015). Like our study, they found that the majority of health professionals agreed on the effectiveness of strategies aimed at health professionals while significantly fewer (16.2%) health professionals supported non-targeted quality improvement programs. This might indicate that although most health professionals are less willing to admit they are not doing well, they are aware of that and think they need improvement.

During the interview, the three most frequently cited strategies recommended by participants included updating the guideline with ethnicity-based research results,

providing training on improving communication skills, and creating a training program targeting nurses. For most relevant studies regarding training programs for health professionals, the target population is mainly physicians. However, in the Netherlands, nurses are those who make appointments with hypertensives for routine visits, offer lifestyle recommendations, and spend the most time with patients. Furthermore, it was mentioned by some interviewees that the awareness and knowledge of ethnic disparity in hypertension control is lower among nurses as compared to physicians. Restricted by the small sample of nurses, we could not confirm this hypothesis in this study. Further study assessing health professionals' perceptions on ethnic disparity in hypertension control should target nurses. The results would inform an intervention aimed at reducing ethnic disparity in hypertension control of the target population.

4.1.5 Health professionals' attitudes towards ethnic-specific training

This study revealed that around 7.9% of the participants have never received any ethnic-specific education. For those who received such education before, the vast majority think it is helpful in improving hypertension care for patients to reduce ethnic disparity in hypertension control. Nevertheless, in the interview, all the participants reported they received very little ethnic-specific education and think there should have been more ethnic-specific education provided in medical school and during training and practice. Considering the lack of ethnic-specific education provided for health professionals and its importance in reducing ethnic disparity in hypertension control,

more ethnic-specific training should be embedded in medical school, during residency training, and during practice.

4.2 Implications for policy, research, and practice

Two acts in the Netherlands regulate the processing of ethnicity data: the Personal Data Protection Act (WBP) and the Medical Treatment Contracts Act (WGBO). According to these two acts, doctors could and even are obligated to keep records of the ethnicity if it is necessary for proper care (Ploem, 2009). However, in reality, data on ethnicity is incomplete. This also brings difficulty in monitoring ethnic minority groups' health condition and evaluating the effectiveness of the treatment. Considering the large majority of health professionals and patients support collecting ethnicity information, the health system in the Netherlands should consider implementing some programs to promote the collection of ethnicity data during routine clinical care.

By collecting ethnicity data, it will help reduce ethnic disparity in health and healthcare; but it has to be taken into account that there might be potential risks of misusing this private information. Therefore, regulations should be issued to protect the private information from being abused. Furthermore, it has to be admitted that collecting ethnicity data is still a sensitive issue and may make patients feel uncomfortable when asked about their ethnicity. However, no studies have been conducted in the Netherlands asking about patients' attitudes towards collecting ethnicity information in clinical settings. Intensive research should focus on studying the patients' acceptance of collecting ethnicity in the Netherlands.

Further research can also be done to compare the performance between health professionals' who chose patients as the greater contributors to ethnic disparity and those who chose themselves as more critical. This could inform the interventions targeting health professionals to reduce ethnic disparity in healthcare.

4.3 Strengths and limitations

To our knowledge, this is the first study evaluating health professionals' knowledge, attitudes, and perceptions about ethnic disparity in hypertension control in the Netherlands. Also, it is the first study using mixed study methods that explores health professionals' attitudes towards ethnic disparity in hypertension control.

Our study also has some limitations. First, since we used an online questionnaire distributed through email, we did not know how many people received the email. Therefore, it was difficult for us to accurately estimate the response rate in this study. We are confident, however, that the response rate is very low. This might due to the way we distributed the surveys. Health professionals are busy and do not have enough motivation to read the email, click the link, and finish the survey. There are several reasons why we chose an online questionnaire instead of a paper survey. First, since our research topic is, to some extent, sensitive, using an online survey can better protect participants' privacy and therefore reduce the number of socially-accepted answers. Second, email is commonly used by health professionals in the Netherlands. Through email, we could reach more potential participants within the limited time period. Third, by using an online survey, we can reduce the budget by not having to account for

printing the paper survey. Fourth, constrained by the limited resources and time, we could not conduct random sampling. Therefore, the results of this study might not be representative of the whole health professional population in the Netherlands. Fifth, social-accepted answers were difficult to avoid in this study. Ethnic disparity is a sensitive topic and they might feel uncomfortable or unwilling to report their true feelings. This might particularly be a problem when health professionals were asked to evaluate or report their own performance. For example, they were asked whether they thought ethnic disparity in hypertension control was a problem among their own patients. Forth, the number of office assistants or nurse practitioners was too little in our study sample. They work with hypertension patients more and may play a more important role in hypertension control. Lastly, the sample size is small. Only 77 participants are recruited in this study. Restricted by the small sample size, it is not valid to draw the conclusion about any associations. For example, it was found that male were more likely than female to report "how much does clinician's attitudes towards ethnic groups" contributing to ethnic disparity in hypertension control. Since the sample size is small, the association found in this study should be validated by other studies with larger sample size.

5. Conclusions

In general, the Dutch health professionals support collecting ethnicity information and think it will help reduce ethnic disparity in hypertension control. Their awareness about the existence of ethnic disparity in hypertension among their own patients, compared with that in the Netherlands, is comparatively low. They tend to attribute ethnic disparity in hypertension control to patients rather than themselves. The vast majority of health professionals favor the strategies targeted at health professionals to improve their awareness, cultural competencies, and communication skills and believe those strategies would be effective in reducing ethnic disparities in hypertension. Although Dutch health professionals have only received a small amount of ethnic-specific education, they think it is helpful to have more ethnic-specific training so that they can improve hypertension care for patients and reduce ethnic disparity in hypertension control.

Appendix A – Online Survey

Perceptions of Dutch Health Professionals about Ethnic Disparity in Hypertension Control

Principal Investigator: Jingyu Tong

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 three 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.

There are no foreseeable risks concerning your participation in this study. If, however, you do not wish to answer any questions, you do not need to do so.
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.

Part 1: Question 1-5 aims to analyze health professionals' perceptions of ethnic disparities in hypertension control in the Netherlands.

Q1 1/20. Do you think the collection of patients' ethnicity data is important to ensure the delivery of high-quality hypertension care for all patients?

o (1) Yes, definitely
o (2) Yes, probably
o (3) No, probably not
o (4) No, definitely not

Q2 2/20. Do you think ethnic disparity in hypertension control* is a problem in the following circumstances? *Ethnic disparity in hypertension control is defined as lower hypertension control rate among certain ethnic groups, compared with European origin people.

	Yes, definitely	Yes, probably	No, probably not	No, definitely not
(1) Within the Netherlands health system	○	○	○	○
(2) Within Amsterdam/The Hague health system	○	○	○	○

(3) Within your health center	○	○	○	○
(4) Among the patients you treat	○	○	○	○

Q3 3/20. In general, how much do you think the following factors contributing to ethnic disparities in hypertension control?

	Great deal	Some	A little	Not at all
(1) Type of health insurance	○	○	○	○
(2) Prescribed medications	○	○	○	○
(3) Clinician attitudes/beliefs about minority patients	○	○	○	○
(4) Clinician workforce diversity	○	○	○	○
(5) General miscommunication with patients	○	○	○	○
(6) Lack of time/resources to address social issues	○	○	○	○

(7) Patient preference for type of treatment	○	○	○	○
(8) Patient attitudes/beliefs about provider	○	○	○	○
(9) Patient understanding of treatment	○	○	○	○
(10) Patient adherence to treatment	○	○	○	○
(11) Patient health behaviors (diet, exercise)	○	○	○	○

Q4 4/20. With more attention for ethnic-specific care, what do you think about the effectiveness of the following strategies?

*For the last option: **cultural competency** is defined as the ability of providers and organizations to effectively deliver health care services that meet the social, cultural, and linguistic needs of patients.

	Very effective	Somewhat effective	Not very effective	Not effective at all
(1) One hypertension care quality improvement programs for all patients	○	○	○	○

(2) Quality improvement programs with a specific focus on care for minority patients	○	○	○	○
(3) Programs to increase clinician awareness of ethnic disparities in hypertension care	○	○	○	○
(4) Programs to promote cultural competency* among clinicians	○	○	○	○

Q5 5/20. Do you think the ethnic-specific education you received helps improve hypertension care for patients and reduce ethnic disparity in hypertension control?

○ (1) Yes, definitely

○ (2) Yes, probably

◯ (3) No, probably not

◯ (4) No, definitely not

◯ (5) I have never received ethnic-specific education

Part 3: Demographic information

Q11 11/20. How many office assistants in average are working in your practices?

◯ Office assistants ____

Q12 12/20. What type of practice are you working in?

◯ Solo practice

◯ Dual practice

◯ Group practice/ health center/ hospital

Q13 13/20. Please estimate the number of patients in your practice

____

Q14 14/20. How many hours per week do you work as a cardiologist/ General Practitioner (GP) including Huisarts assistent in opleiding (HAIO)/ office assistant?

____

15 15/20. What is your professional background?

◯ General practitioner

◯ Nurse practitioner or office assistant

◯ Cardiologist

Q16 16/20. Years since graduation from medical school or equivalent clinical training degree?

◯ <11 (1)

◯ 11 to 20 (2)

◯ 20 to 27 (3)

◯ > 27 (4)

◯ Do not have such a medical degree (5)

Q17 17/20. Do you think your patients are ethnically diverse?

◯ Yes, definitely (1)

○ Yes, probably (2)

○ No, probably not (3)

○ No, definitely not (4)

Q18 18/20. What's your gender?

○ Male (1)

○ Female (2)

○ Others (3)

Q19 19/20. What is your age?

○ No more than 35

○ 35~50

○ More than 50

Q20 20/20. What is your ethnicity?

○ White Dutch

- ○ African origin
- ○ Asian origin
- ○ Others
- ○ Prefer not to answer

Appendix B – Interview Guide

Perceptions of Dutch Health Professionals about Ethnic Disparity in Hypertension Control

Principal Investigator: Jingyu Tong

Supervisor: L.M. Brewster; Lijing Yan; Vanessa Harris

Aim: To assess health professionals' perceptions on ethnic disparity in hypertension care; to inform the further actions to be taken to effectively reduce ethnic disparity in hypertension care. 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: 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: In the Netherlands, many papers indicates that hypertension awareness is higher among certain ethnic groups, while hypertension control rate is lower compared with European origin population. Hypertension control rate is one of the most important indicator of quality of hypertension care. Considering health professionals' direct interfacing with patients and the healthcare system, they can play an important role in addressing ethnic disparity in hypertension care. Therefore, it is very important to understand health professionals' perceptions on ethnic disparity in hypertension care, so that further actions could be taken to effectively reduce the ethnic disparity in hypertension care.

1. Do you think the collection of patients' ethnicity data is important to ensure the delivery of high-quality care for all patients?

a. If yes, why it is important?
b. If not, why not collecting the data?
c. Would you recommend collecting patients' ethnicity data in HER considering no ethnicity data are collected in the current health system?
    i. If yes, why? How do you think it would help?
        1. In your opinion, what would be the barrier of collecting ethnicity data? Patients, policy makers, healthcare workers or other stakeholders?
    ii. If no, why not? If it is because of the history, is it still a problem now?

2. What is the medicine that you prescribe most to hypertension patients with African ancestry?
    a. What about ACE?
    b. Why do you prescribe it? Do you know that the guideline recommends it in a different way?
    c. Why do not you prescribe it?
3. a. Do you think quality of hypertension care differs among patients from different ethnic groups in the Netherlands health system?

b. Do you think quality of hypertension care differs among patients from different ethnic groups in other clinics in Amsterdam?

c. Do you think quality of hypertension care differs among patients from different ethnic groups in your clinic?

d. Do you think quality of hypertension care differs among patients from different ethnic groups in the patients you treated?

i. Why do you think this happens in the health system or other health centers? Have you seen or heard about this happened in other clinics? How does ethnicity affect the quality of hypertension care?
ii. Have you experienced this in your clinic? How does ethnicity affect the quality of hypertension care?

iii. (for any yes answer) How do you think patient ethnicity would affect quality of hypertension care?

4. According to your experience, is there any certain ethnic groups that need special attention to improve their quality of hypertension?
    a. If yes, which ethnic group? what is the reason that they need special treatment?
5. It is said that three main factors contributing to the ethnic disparity in hypertension care - patient, physician, and health system factors, which do you think play the most important role (one or two or all of them)?
    a. Why do you think this one is more important?
    b. How does this factor contribute to the ethnic disparity in hypertension care?
6. What strategy would you recommend to eliminate the ethnic disparity in hypertension care
    a. Would you support non-targeted quality improvement programs?
        i. If yes, how can it help eliminate the ethnic disparity
        ii. If no, why
    b. Would you support quality improvement programs with a specific focus on care for minority patients?
        i. If yes, how can it help eliminate the ethnic disparity
        ii. If no, why
    c. Would you support programs to increase clinician awareness of ethnic disparities in hypertension care
        i. If yes, how can it help eliminate the ethnic disparity
        ii. If no, why
    d. Would you support programs to promote cultural competency among clinicians?
        i. If yes, how can it help eliminate the ethnic disparity
        ii. If no, why

e. If you have to choose one from those strategies that you think would be effective, which one would it be? Why?
f. Is there any other strategy that you think would help to eliminate the ethnic disparity in hypertension care?
    i. Why and how do you think it would help?

7. Did you ever receive ethnic-specific education during medical school? Do you think it helps to improve hypertension care for patients?
    a. If yes, how does it help? Do you have any suggestions to improve the effectiveness of ethnic-specific education?
    b. If no, do you wish to have? What may be the reasons why there is no such education in medical school?
        i. If yes, how do you expect it to be? The contents, frequency, any suggestions?
        ii. If not, why not?

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

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