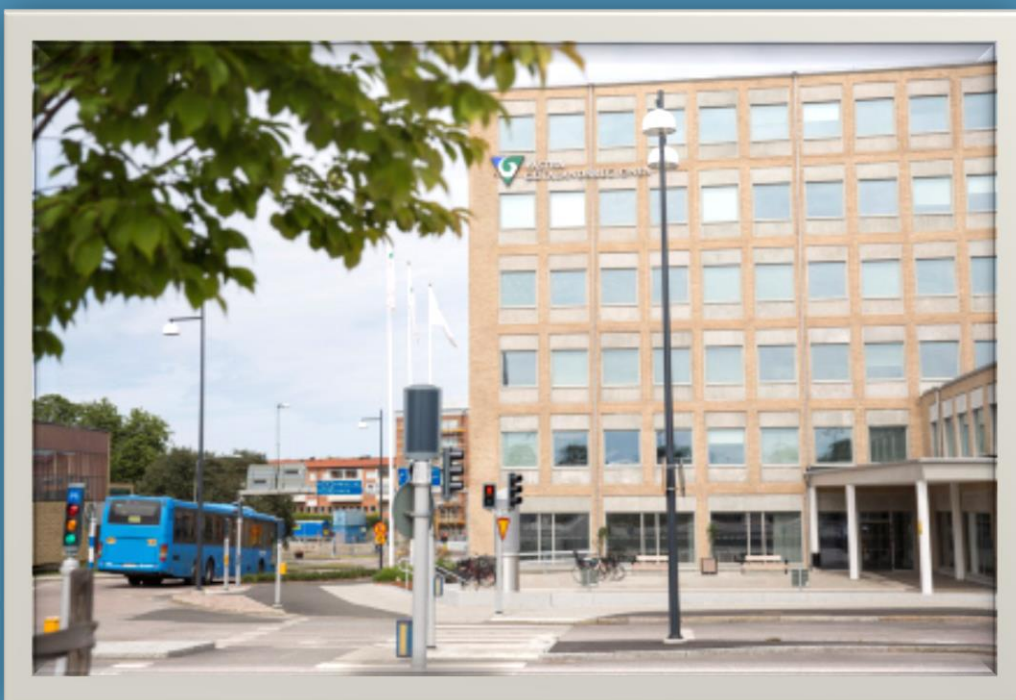


Blood pressure monitoring in patients with hypertension in primary health care in Sweden



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Rapport 2022:5

FoU-centrum Skaraborg

Rapport 2022:5

FoU i VGR: [Kartläggning av teknik för blodtrycksmätning ... | FoU i Västra Götalandsregionen \(researchweb.org\)](#)

Utförd i grundläggande kurs i FoU-metodik
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Abstract

Hypertension (HT) is a common and leading risk factor for cardiovascular complications such as stroke and coronary heart disease. Diagnosis, management, and follow-up of patients with HT is mainly performed in primary health care (PHC). It has been shown that attainment of blood pressure (BP) goals for treatment are around 50% and varies between PHC-centres (PHCC's). The management includes monitoring of the patients which could contribute to this variation. It is therefore of interest to gain knowledge of how BP measurements are performed at the PHCC Närhälsan Tibro, Skaraborg, the PHCC's in Region Västra Götaland (VGR) and in seven other regions in Sweden.

Methods

In 2020-2021, the staff responsible for management of HT in 7-10 randomly selected PHCC's from each of eight regions in Sweden was interviewed by telephone. The interviews lasting approximately 60 minutes and contained both closed-ended questions (yes/no) answers and open-ended questions on HT management and BP monitoring techniques. The author performed face-to-face interviews with the staff (n=4) at Närhälsan Tibro. Data was presented as means and measures of dispersion. For differences between regions, Chi-square tests were used for discrete variables, numbers and frequencies and T-test for continuous variables. A p-value of <0.05 was considered significant. Data from Närhälsan Tibro was only used for visual comparison.

Results

The prevalence of team-based structured care, use of written guidelines and mode of BP measurements were similar in Tibro, VGR and the other seven regions. Three BP measurements at a single visit and occurrence of HT diagnosis at the first visit in patients with high BP and high risk for complications were more common in VGR (7/10 vs. 21/65, $p=0.02$) and (5/10 vs. 10/66, $p=0.001$), respectively.

Conclusion

There were only minor differences in management of HT between VGR and the seven other regions in Sweden.

Keywords

Primary health care, hypertension, blood pressure determination, patient care team.

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Appendix 1

Background

Hypertension (HT) is persistently high blood pressure (BP) in the systemic arteries (1) and is the leading risk factor for cardiovascular complications and mortality around the world. The most common complications include stroke, coronary heart disease, and heart and kidney failure. 77% of individuals with stroke, 69% of individuals with first myocardial infarction and 74% of individuals with congestive heart failure have HT. Every 20 mm Hg increase in Systolic Blood Pressure (SBP) above 115/75 mm Hg is associated to a doubling of mortality rate in cardiovascular disease (CVD) (2). HT is the most common chronic diagnosis in Sweden as one third of the adult population is affected (3).

Clinical trials have showed that the absolute risk for CVD determines the benefits of HT treatment (4). Lowering of BP in patients with HT decreases the risk for CVD (5). Lifestyle changes including regular physical activity and eating healthier with less salt for some individuals and limiting the consumption of alcohol can reduce HT. To reduce weight in overweight or obese individuals leads to a lower metabolic risk. However, if the lifestyle changes do not help in reaching the BP target or if the patient's overall risk for complications is high, one or two antihypertensive drugs should be prescribed (6).

Treatment of HT includes first line drugs diuretics (thiazides), Angiotensin-Converting Enzyme (ACE), inhibitors Angiotensin II Receptor Blockers (ARBs) and calcium channel blockers. Second line drugs are betareceptor blockers, Mineralkortikoid Receptor blockers (MRA) and alfa-receptor blockers.

It is very important to reach treatment targets to decrease the risk for complications. This requires a lot of effort and appropriate organization as the treatment requires tight and regular follow-ups at least at the start of treatment.

The European Society of Cardiology and HT guidelines define BP treatment targets of <140/90 mm Hg for all patients, but in patients <65 years SBP 120-129 mmHg is recommended (6). In older patients the treatment should be individualized, taking the patients co-morbidity and other drug treatment into account.

Blood pressure measurements

In 1828, Jean Léonard Marie Poiseuille presented the first mercury manometer for intra-arterial BP measurements in his doctoral thesis. Carl Ludwig upgraded Poiseuille's manometer by adding real-time tracking of the BP wave. It was not possible to measure BP noninvasively until Vierordt in 1855 invented the first device to detect a human pulse which could also quantify arterial BP for the first time. Previous methods of measuring BP required a tube to be inserted into an artery. Vierordt theory was that BP can be measured by using a counter pressure which suppress the pulse wave. This was achieved by using mechanical weights and balance (7). In 1896, Riva-Rocci developed a revolutionary method by using a cuff rubber bulb which encircled the arm. The bulb was filled with water or air and compressed the artery to counteract the pressure of the pulse wave of the BP in the brachial artery (8). The Russian surgeon Nicolai Korotkoff reported in 1905 that the peak of the pulse wave (SBP) and the relaxation of the artery (diastolic BP) could easily be determined by auscultation over the cubital artery. The appearance and disappearance of the pulse sounds (Korotkoffs sounds) correlated

to the respective BP. Auscultation over the cubital artery is still the most common way to determine BP (9). In 1981, automated oscillometer measurement was introduced by Donald Nunn. Digital monitors use oscillometric and electronic measurements instead of manual auscultation which are easier and do not need specific training (10). In 1993, an automatic wrist cuff to measure BP was developed and resulted in a wireless BP monitor which is increasingly used today.

It is very important that diagnosis of HT is verified with several BP measurements before the start of the treatment which is life-long. The diagnostic procedure starts in most patients with office-based BP but can be accompanied by other forms of HT that require disease specific treatments. Manual office-based BP method is under debate as the registration can lead to digit preference (11), which is rounding up the BP value to the nearest zero or five number. This might lead to misdiagnosis or lower attainment of BP goal. Automated office BP readings are more accurate than manual office readings among patients with HT, according to a JAMA Internal Medicine meta-analysis (12).

In automated measurement of BP, the device measures the mean arterial pressure and this to calculate the systolic and diastolic BP. It is easy to use, and patients can use it at home in a relaxed and calm environment to give an accurate BP reading and avoid the white-coat effect. In contrast, it can be stressful for some patients when they have responsibility to follow up their BP. Multiple readings should be recorded to give an average. A Swedish systematic review from 2010 has shown that self-monitored BP at home (SBU 2010, 13) is equally reliable as office BP. Furthermore, ambulatory blood pressure measurement (ABPM) is a better predictor for CVD than office BP (14).

Most of hypertensive patients are diagnosed, treated, and followed-up in Primary Health Care (PHC) internationally and in Sweden. It is a great challenge for PHC's to manage the large number of patients with chronic conditions such as HT as reported by World Health Organisation (WHO) (15). This leads to variations in BP management between the PHC's. Home or self-monitoring of BP can save costs due to fewer clinic visits, but it needs extra time to administer and respond to the patient's measurements (16).

At Närhälsan Tibro, Primary Health Care Centre (PHCC), the BP team (comprising of two General Practitioners (GP's) and two nurses) follows national and local guidelines on BP management. Three standardized BP measurements of $\geq 140/90$ mm Hg at different visits are needed to confirm HT diagnosis. The BP is monitored by a nurse while the patient is sitting down. If the nurse finds that the drug treatment is not sufficient, contact will be taken with a GP for ABPM or investigation for suspected secondary HT.

As seen in the quality register in Västra Götaland Region (VGR) called QregPV, there are variations of BP goal attainment between PHC's (17). Management of patients with HT can differ from one clinic to another, for example monitoring of BP. It is therefore of interest to gain knowledge of how BP measurements are performed in PHCC Närhälsan Tibro, PHCC's in VGR and in other regions in Sweden.

Aims

This study aims to assess, by personal interviews and telephone interviews, BP management and monitoring techniques in PHCC's in Sweden. This includes Närhälsan PHCC in Tibro, Skaraborg, another ten randomly selected PHCC's in VGR and in each of seven other regions in Sweden.

Research Questions

- 1) Is there a team based structured care of HT in the PHCC?
- 2) Which professional staff leads the HT team in the PHCC? GP, nurse or assistant nurse?
- 3) Are there written guidelines for HT diagnosis?
- 4) How long is the patient resting before BP measurements?
- 5) What is the body position of the patient during BP measurements?
- 6) How is BP monitored for HT diagnosis? Manually or automatically?
- 7) How many times are the measurements performed? Is the mean value calculated?
- 8) How many BP readings on different visits are included before HT is diagnosed?
- 9) How often are home BP measurements used for BP diagnosis?
- 10) How often are ABPM used for diagnosis?
- 11) Were there any differences between VGR and the seven other regions?

Material and Methods

Study design

The survey aimed to, by telephone interviews, collect data on HT management from 10 randomly selected PHCC's in eight regions in Sweden: Jämtland, Jönköping, Stockholm, Värmland, Västerbotten, VGR, Örebro, and Östergötland using a random number generator stratified for region. A structured interview questionnaire developed by the team of GP's in the Swedish CARDiovascular Research in Primary Care (SCARP) network was reviewed during several telephone meetings and tested at the GP's own PHCC's. Information about the interview was sent by e-mail to the managers of the consecutive PHCC's on the random list until 10 Practice Managers accepted participation. Two reminders were sent to each PHCC.

The PHCC's manager or an employee (GP or nurse) which participated sent a signed informed consent form and a suitable time for interview was agreed upon. Every interview took approximately 60 minutes. Questionnaires included different types of questions including closed-ended questions with yes or no answers and open-ended question about mode of diagnosing, treatment, and information on the organization, Appendix 1. The answers in the questionnaire were recorded in Smart trial® (MEDEI ApS, 2017) eCRF and were transferred to Excel (Microsoft version 2010) and SPSS (version 28).

Additional data from Närhälsan Tibro (the manager, one GP and two nurses) that answered the same questionnaire in a face-to-face interview by the author.

Example of questions: What is the recommended body position of the patient during BP measuring? There were three possible answers for this question: Sitting, lying or the patient's body position can vary between practitioners. How is BP monitored for HT diagnosis? There were 3 potential ways to measure BP- digitally with a machine, manually by the practitioner with a cuff and stethoscope or both ways which varied between practitioners. For additional questions see Appendix 1.

Statistical methods

Descriptive statistics were presented as means and measures of dispersion. In analyses of differences between PHCC's, Chi-square tests were used for discrete variables, numbers and frequencies and T-test for continuous variables. A p-value of < 0.05 was considered significant. Chi-square was calculated by using an online chi-square calculator from a website, social science statistics (18). Bar charts were created using Excel (Microsoft version 2010). The data from Närhälsan Tibro PHCC was not included in the analysis and is presented separately for comparison.

Ethical considerations

In this study, no individual patient data was used. The participation of the interviewees (PHCC staff) was voluntary and could be cancelled at any time. The individual PHCC's names and data will not be published and is presented in groups. Individual PHCC's will not be recognized, besides Närhälsan Tibro PHCC. As data is intended to be published in peer-reviewed journals, the study was approved by The Ethics Review Authority reference: 2019-01629 and amendment reference: 2020-00478.

Results

Ten clinics each from Jönköping, Stockholm, Värmland, VGR, Örebro, and Östergötland, seven clinics from Västerbotten and nine clinics from Jämtland-Härjedalen accepted to participate in the interviews, Table 1. The total number of participating clinics was 76, (not the estimated number of 80 due to difficulties to perform interviews during the Covid-19 pandemic), including 35 GP's, 39 nurses, one nurse assistant and one health care administrator.

Data from Närhälsan Tibro PHCC, VGR which was collected by the author was added to the tables. The clinics differed greatly in numbers of listed patients, the smallest clinic had 763 listed patients and the largest had 31,350 patients. 58 PHCC's were publicly managed, 16 were private and 2 had other forms of management. One PHCC was geographically situated in the nearby hospital and the furthest PHCC was 240 km to the nearest hospital.

Table 1. Population size, number of eligible primary health care centres, listed patients at participating PHCC's and the number of completed interviews in the study. Närhälsan Tibro primary health care centre was not included in the analyses but was studied separately. All data are numbers. PHCC, primary health care centre; N/A, not applicable.

Regions	Population Dec 2020	Eligible PHCC	Total number of listed patients in PHCC's	Interviews
Jämtland Härjedalen	131,000	27	47,488	9
Jönköping	365,000	42	94,478	10
Värmland	283,000	30	83,427	10
Västerbotten	273,000	39	64,770	7
Västra Götaland	1,734,000	203	88,176	10
Stockholm	2,392,000	209	140,491	10
Örebro	305,000	29	92,329	10
Östergötland	467,000	43	100,785	10
Total	5,950,00	622	711.944	76
<i>Tibro</i>	<i>11,275</i>	<i>N/A</i>	<i>8870,00</i>	<i>4</i>

From the original questionnaire, ten questions were chosen for the analyses in this project.

The answers to the ten questions from the staff in Närhälsan Tibro were denoted person one – four to conceal the identity of the interviewee, Table 2.

Table 2. Answers to ten selected questions on hypertension care from the questionnaire distributed to four interviewees in Närhälsan Tibro, Västra Götaland region.

- , no answer to the question

ABPM, ambulatory blood pressure measurement; BP, blood pressure; CVD, cardiovascular disease; HT, hypertension; PHCC, primary health care centre.

Questions	Person 1	Person 2	Person 3	Person 4
Is there a team responsible for HT in the PHCC?	Yes	Yes	Yes	Yes
Which professional staff lead the HT in the PHCC?	Nurse	Nurse	Nurse	GP / Nurse
Are there written guidelines for HT diagnosis?	Yes	Yes	Yes	Yes
How long is it recommended that the patient rests before BP is measured?	5-10 mins	15 mins	-	5 mins
What is the body position of the patient during BP measurements?	Sitting	Sitting	Sitting	Sitting
How is BP monitored for HT diagnosis? Manually or digital?	Digital	Both	Digital	Digital
How many times are the measurements performed?				
a) Low risk for CDV	3 times	-	3 times	3 times
b) Medium risk for CDV	3 times	-	3 times	3 times
c) High risk for CDV	3 times	-	3 times	3 times
How many BP readings are taken on different visits before HT is diagnosed?	2 times	-	-	3 times
How often is home BP measuring used for BP diagnosis?	Rarely	Often	Sometimes	Sometimes
How often is ABPM used for diagnosis?	Sometimes	Sometimes	Sometimes	Sometimes

Table 3. Total number of interviewees at the primary health care centre's in eight regions in Sweden.

- , no answer to the question

*'Other' has been added as the vocational role for these were missing

**In Västra Götaland, a nurse and a GP completed the interview together

***In Värmland, a nurse and nurse assistant completed the interview together

Region	GP	Nurse	Care Administrator	Nurse Assistant	Other *	Total
Örebro	-	9	1	-	-	10
Västerbotten	7	-	-	-	-	7
Stockholm	7	3	-	-	-	10
Västra Götaland	3	7 (1)**	-	-	-	10
Östergötland	4	2	-	-	4	10
Jämtland / Härjedalen	2	5	-	-	2	9
Värmland	2	7	-	1 (1)***	-	10
Jönköping	6	4	-	-	-	10
Total	31	37	1	1	6	76

Is there a team based structured care of HT in the PHCC?

There was no difference in frequency of team based structured care between the investigated PHCC's in Sweden, 53% in other regions and 30% in VGR $p=0.17$. All four of the staff at Närhälsan Tibro PHCC answered that they had a team based structured care for patients with HT.

Table 4. Team base structure of hypertension across the primary health care centres in Västra Götaland region (VGR) compared to seven other regions in Sweden.

	Yes	No	Total	<i>p</i>
VGR	3	7	10	
Other regions	35	31	66	
Total	38	38	76	0.17
<i>Tibro</i>	<i>4</i>	<i>0</i>	<i>4</i>	

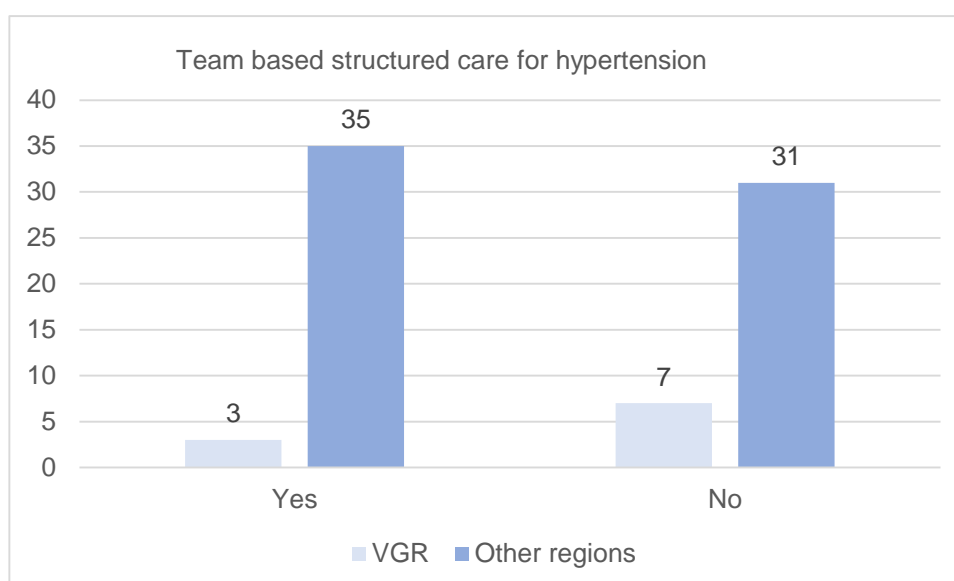


Figure 1. Prevalence of team based structured care for hypertension in Västra Götaland region (VGR) compared to seven other regions in Sweden. Västra Götaland region has a total of 10 clinics whilst other regions have a total of 66.

Who leads the HT team at the PHCC? A GP, a nurse or an assistant nurse?

There was no difference between the seven regions and VGR concerning the professions leading the team for structured care of HT. At Närhälsan Tibro PHCC one of the interviewees selected both a nurse and a GP.

Table 5. Distribution of the profession of the leader of the 38 teams for structured care of hypertension in Västra Götaland region, seven other regions in Sweden and Närhälsan Tibro primary health care centre.

*One interviewee selected both nurse and GP

	GP	Nurse	Other	Total	<i>p</i>
VGR	3	1	3	7	
Other regions	5	20	6	31	
Total	8	21	9	38	0.05
<i>Tibro</i>	<i>1</i>	<i>4</i>	<i>0</i>	<i>5*</i>	

Are there written guidelines for HT diagnosis?

In VGR, 90% of PHCC's have written guidelines for help when diagnosing HT, Table 6. These guidelines included advice for the process for measuring BP including amount of time for rest before recording the BP and the position of the patient during the recording for more accurate results. In addition, the guidelines should include criteria for diagnosis and subsequent treatment and follow up processes. In one PHCC, this question had an ambiguous answer written in text so

a clear yes or no couldn't be evaluated. This PHCC was excluded from the analysis.

Table 6. Use of written guidelines to diagnose hypertension in primary health care centres in Västra Götaland region, seven other regions in Sweden and in Närhälsan Tibro primary health care centre. One primary health care centre was excluded due to ambiguous answers.

	Yes	No	Total	<i>p</i>
VGR	9	1	10	
Other regions	57	8	65	
Total	66	9	75	0.83
<i>Tibro</i>	<i>4</i>	<i>0</i>	<i>4</i>	

There was no difference between VGR and the seven other regions concerning use of written guidelines management of HT.

How long is the patient resting before BP measurements?

The interviewees across Sweden recommended a resting time before BP measurements that ranged from five to ten minutes, Table 7. Most recommend five minutes or slightly less than ten minutes. In two PHCC's, twenty minutes was recommended. There was no significant difference between the recommended resting time in VGR compared to the other seven regions.

Table 7. Resting time before blood pressure measurement are taken, recommended by interviewees in Västra Götalands region, seven other regions in Sweden and at Närhälsan Tibro primary health care centre.

*In Närhälsan Tibro, a participant selected 5-10 mins which was reported as 5 and 10 mins

	0 mins	5 mins	10 mins	12 mins	15 mins	20 mins	Total	<i>p</i>
VGR	0	7	1	1	0	1	10	
Other regions	1	24	26	0	13	2	66	
Total	1	31	27	1	13	3	76	0.08
<i>Tibro</i>	<i>0</i>	<i>2</i>	<i>2</i>	<i>0</i>	<i>1</i>	<i>0</i>	<i>5*</i>	

What is the body position of the patient during BP measurements?

Most of the interviewees recommended a sitting position before measuring BP, Table 8. Additionally, varying body positions were recommended depending on who was performing the measurement.

Table 8. Patient positions during measurement of blood pressure in primary health care centres in Västra Götaland region, seven other regions in Sweden and at Närhälsan Tibro primary health care centre.

	Sitting	Lying	Varies	Total	<i>p</i>
VGR	7	1	2	10	
Other regions	50	7	8	65	
Total	57	8	10	75	0.80
<i>Tibro</i>	4	0	0	4	

The most common body position was ‘sitting’. A small proportion choose ‘lying’ and ‘varies’ which correspond to there being no difference between the frequencies of body positions in VGR and the other seven regions in Sweden. The interviewees at Tibro PHCC seemed to answer following the same pattern as the other interviewees.

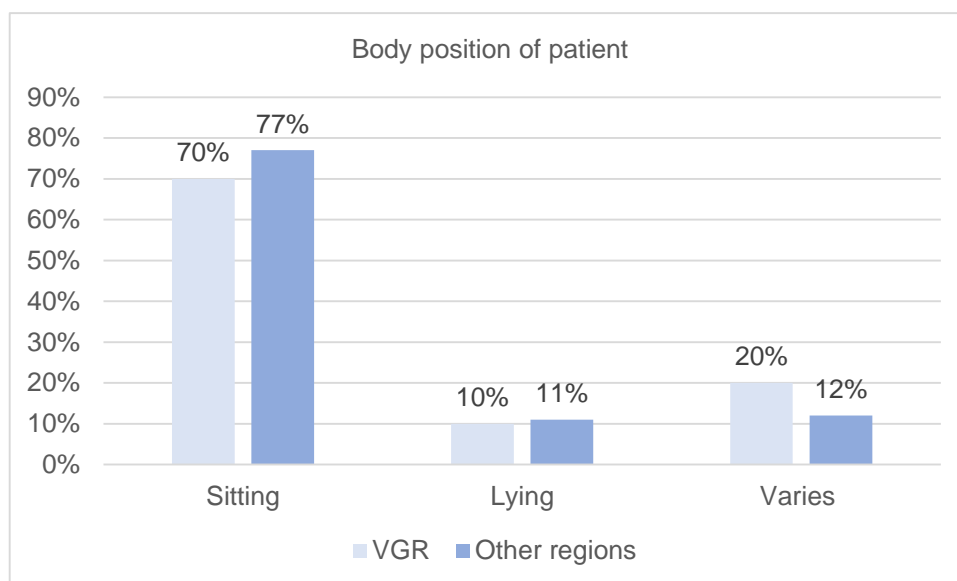


Figure 2. Prevalence of team based structured care for hypertension in Västra Götaland region (VGR) compared to seven other regions in Sweden. Västra Götaland region has a total of 10 clinics whilst other regions have a total of 66.

How is BP monitored before HT diagnosis? Manually or automatic?

The technique for office BP measurements seemed to vary between VGR and the other seven regions. In VGR, manual measurements were less often used including Närhälsan Tibro PHCC. Digital or digital combined with manual

measuring were more often used though the statistical analysis and showed no difference.

Table 9. Shows how blood pressure was monitored throughout Västra Götaland Region, other regions and Närhälsan Tibro primary health care centre for hypertension diagnosis.

	Digital	Manual	Digital and manual	Total	p
VGR	6	1	3	10	
Other regions	18	18	30	66	
Total	24	19	33	76	0.11
<i>Tibro</i>	3	0	1	4	

How many times is the BP measured? Is the mean value calculated?

The BP was usually measured more than once during a visit to get a more accurate value. The mean of the BP values was calculated to find the average BP value.

Table 10 shows the number of readings at the same visit in VGR and in other regions. The number of measurements ranged from 0 to 4. One PHCC answered 0 reading, and this was considered as missing data. Approximately 25% of the BP readings from the other seven regions were taken only once. This differs from the readings in VGR and at Närhälsan Tibro PHCC. Due to the data containing zero values, the chi-square was calculated on VGR and other regions for number of 2 and 3 readings. There was no significant difference between VGR and the other regions, $p=0.15$.

Comparing the frequency of three readings on the same visit, which is recommended, with a combination of the remaining frequencies of readings (VGR 7/10 vs. other regions 21/65) shows significantly higher frequency in VGR compared to the other regions, $p=0.02$.

Table 10. The number of times the blood pressure was measured at one single visit in Västra Götalands region, the seven other regions in Sweden and at Närhälsan Tibro primary health care centre. (1) was considered missing data.

	0	1	2	3	4	-	Total
VGR	0	0	3	7	0	0	10
Other regions	(1)	16	26	21	1	1	65
Total	(1)	16	29	28	1	1	75
<i>Tibro</i>	0	0	1	1	0	0	2

How many BP readings on different visits were included before HT is diagnosed?

The number of BP readings before HT diagnosis differs between the assessed risk groups the patient belonged to. Low risk patients had their BP pressure measured on three different visits whilst medium risk patients followed a similar trend. Also, the high-risk patients followed the same pattern as low and middle risk patients with measurements BP at three different visits, but measuring the BP only once was the second most common answer for VGR but not in the other seven regions. The results show that patients with low, medium, and high risk most often had three visits for measuring BP before being diagnosed with HT. Table 11 shows that there were three participants that answered zero readings for high-risk patients in VGR and other regions. Therefore, frequency of three visits for the other risk groups were compared. Comparing low risk patients to the frequency of visits (zero, one, two, four and five) in the other risk groups showed no difference, $p=1.79$. Similarly, there was no difference in frequency of three visits between patients in the medium risk group compared to the other groups $p=0.75$.

Other regions PHCC, analysed that two measurements at different visits was the second most common answer for the high-risk group, followed closed by one visit.

Therefore, frequency of three visits for the other risk groups, according to SCORE, an algorithm to assess risk for cardiovascular complications (19) were compared. Comparing low risk patients to the frequency of visits (zero, one, two, four and five) in the other risk groups showed no difference, $p= 1.79$. Similarly, there was no difference in frequency of three visits between patients in the medium risk group compared to the other groups $p=0.75$.

Table 11. The number of times blood pressure was measured before diagnosis of hypertension in patient with low, medium and high risk for cardiovascular complications according to SCORE 2015. In Västra Götaland region (VGR), the seven other regions in Sweden and at Närhälsan Tibro primary health care centre.

Low risk patients								
	0	1	2	3	4	5	-	Total
VGR	0	0	0	9	0	1	0	10
Other regions	4	2	8	46	4	0	2	66
Total	4	2	8	55	4	1	2	76
<i>Tibro</i>	0	0	0	4	0	0	0	4

Medium risk patients								
	0	1	2	3	4	5	-	Total
VGR	0	0	4	6	0	-	0	10
Other regions	4	2	11	43	4	-	2	66
Total	4	2	15	49	4	-	2	76
<i>Tibro</i>	0	0	0	4	0	-	-	4

High risk patients								
	0	1	2	3	4	5	-	Total
VGR	1	5	4	0	0	-	0	10
Other regions	2	10	13	36	3	-	2	66
Total	3	15	17	36	3	-	2	76
<i>Tibro</i>	0	0	0	4	0	-	-	4

In patients belonging to the high-risk group, only one visit for diagnosis was more common in VGR than in the other regions, $p= 0.001$, Figure 3.

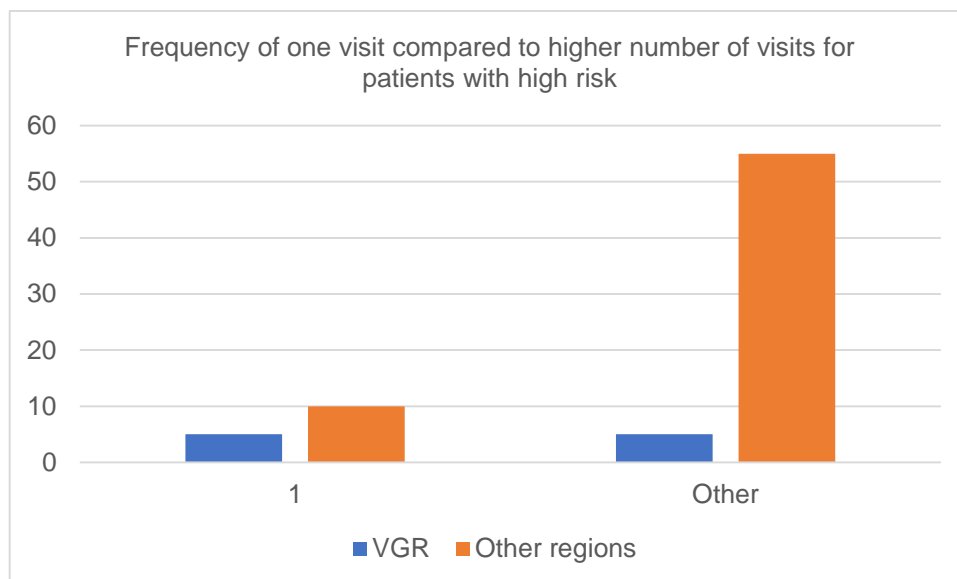


Figure 3. In patients belonging to the high-risk group, diagnosis in first visit was compared to the remaining higher number of visits and was more common than higher number of visits in VGR compared to the other regions, $p= 0.001$.

Chi-square analysis for the whole frequency distribution could not be calculated as most of the data across the three risk groups contained the value 0. For the patients in the high-risk group, BP measurement was performed once in 15 PHCC's (20%). The frequencies of two or more measurements appear similar for between the groups.

How often is home BP and ambulatory BP measuring used for HT diagnosis?

Participants in most of the PHCC's stated that home measure of BP can be used sometimes or never to a greater extent than often. There was no significant difference between VGR and the other seven regions in Sweden.

There was a certain utilisation of ABPM. For example, Närhälsan Tibro PHCC and the PHCC's in VGR used ABPM monitoring sometimes for the diagnosis. However, there was no significant difference in the utilization of ABPM in VGR compared to the other seven regions in Sweden.

Discussion

This study shows that there were no differences in frequency of teams dedicated to HT management, use of guidelines for diagnosis and treatment, how BP was measured (rest before measurement, body position, what kind of measurement) and the way HT was diagnosed (number of visits with BP measurements) in VGR compared to the other seven regions in Sweden (Jämtland, Jönköping, Stockholm, Värmland, Västerbotten, VGR, Örebro, and Östergötland). The only difference found was that the use of three BP measurements at one visit was more common in VGR than in the other regions. Furthermore, patients with high BP and high

risk of complication were more often diagnosed at the first visit in VGR according to the results.

The BP can be measured more than once during a visit to get a more accurate value. There are several factors determining this. For example, a high or low reading on the first attempt may prompt the practitioner to repeat the measurement to make sure that the initial reading is correct. Another example is that the patient might be worried and stressed, leading to increased BP, but after resting the patient becomes more relaxed and the 2nd or 3rd readings may give lower BP. BP recordings in patients with high risk for cardiovascular complications might be performed only at one visit. This was the second most common answer from the participants. In such cases HT can be diagnosed at the first visit and therapy started, therefore, a follow up session for further measurements was not needed for diagnosis. It was unlikely that high risk patients should have at least one BP measurement at the visit with either a GP or nurse. This may be due to the participants not understanding the question which has provided false data for high-risk patients and potential the rest of the data for this question including low and medium risk patients.

The use of ambulant BP monitoring, 24-hour BP recording and home-measured BP which was used for infrequent and did not differ between VGR and the other regions. This might be because it was used in certain instances such as an extra monitoring when recordings show variation between measurements at home and in the PHCC, when secondary HT is suspected or to convince the patients the BP is high and need to be treated (20), along with other BP measurements so was therefore never used as the only measurement to diagnosis BP. In addition, the practitioner would not start with ABPM monitoring before an initial assessment was carried out which would include measuring BP either digitally or manually. Additionally, the practitioner might ask the patient to self-monitor BP at home or ask for a few follow up appointments before the ABPM monitoring. Therefore, ABPM monitoring can be a contribution to the diagnosis but was usually not the only monitoring carried out.

Strength and limitations

This study has some limitations. The participation was voluntary and there was different frequency of answering PHCC's in the regions. In addition, the data was self-reported which might give biased data as interviewees could be prone to describe their management as more favourable than actual. Also, the comparisons were between VGR with only ten PHCC's which is a rather small number. The strength was that the survey covered a large part of Sweden and therefore can give a reasonable picture of HT management in Sweden.

Conclusion

In summary, the prevalence of team-based structured care, use of written guidelines and mode of BP measurements were similar in VGR compared to the other seven regions. The number of measurements at one visit and diagnosis of HT at first visit in patients with high BP and high risk for complications differed significantly. Thus, there were only minor differences in management of HT between VGR and the seven other regions in Sweden.

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Urval av frågor som användes i detta ST-projekt från den enkät som användes vid telefonintervjuer av deltagare (läkare, sjuksköterskor och annan personal) vid 76 vårdcentraler i åtta regioner i Sverige i en nationell studie av omhändertagande av patienter med hypertoni.

Finns det en särskilt definierad blodtrycksmottagning? Ja/nej
Vem leder den? Läkare, sjuksköterska, annan
Har ni skriftliga riktlinjer för blodtrycksmottagningen? Ja/nej
Hur länge rekommenderas patienten vila innan blodtrycksmätning? Minuter
Rekommenderad kroppsposition vid blodtrycksmätning? Sittande, liggande, patientens kroppsposition varierar mellan vårdgivare.
Typer av blodtrycksmätare för hypertoniagnostik vid er mottagning? Digital mätning dominerar, manuell mätning dominerar, digital och manuell blodtrycksmätning tillämpas omväxlande
Antal rekommenderade mätningar vid samma tillfälle st
Antal mättillfällen före fastställande av hypertoniagnostik: Patient låg riskmättillfällen Patienter med måttligt ökad riskprofil.....mättillfällen Patienter med låg eller mycket hög riskprofil.....mättillfällen
Används hembloodtrycksmätning vid diagnostik av hypertoni? aldrig/ibland/ofta
Används 24-tim blodtrycksmätning vid diagnostik av hypertoni? aldrig/ibland/ofta



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