

RESULTS OF BLOOD PRESSURE SCREENING IN PEOPLE 18 YEARS AND OLDER IN NGHE AN: A CROSS-SECTIONAL STUDY IN 5 YEARS FROM 2016-2020

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ABSTRACT

Aim: Determine the rate of hypertension, the proportion of hypertensive people taking medication, the proportion of people taking antihypertensive medication to achieve the target and the proportion of people who were measured the blood pressure in the last 12 months.

Subjects and methods: People at the age of 18 years and older, including both sexes, including people with blood pressure. The total number of people having screening test accounts for 12303 people.

All patients were allowed to have a rest at least 5 minutes before the measurement, then they have their blood pressure measured in a sitting position, measured 3 times with one-minute observation interval. The measuring room is airy and has an ambient temperature of 300 C. The person doing the measurement is a final-year student and the nurses are thoroughly trained in how to measure and record data.

Results: The overall prevalence of hypertension in the study population was 31.4%. The rate of grade I hypertension accounts for 82.1%. The rate of isolated systolic hypertension is 43.7%. The rate of people with treated hypertension is 40.8%. Percentage of people with the target blood pressure over the total number of hypertensive people is 29.7%. Percentage of hypertensive people taking medication with the target blood pressure is 72.9%. The proportion of people who were not measured the blood pressure in the last 12 months is up to 60.4%.

Conclusion: nearly 1/3 of the population aged 18 years and older has hypertension. The proportion of people using medication to treat hypertension is low (40.8%). The rate of achieving target blood pressure among people with hypertension is still low.

I. INTRODUCTION

Hypertension is one of four non-transmissible diseases with a high prevalence, the leading cause of disability and death for the elderly in both developed and developing countries, estimated to cause 10.4 million deaths worldwide each year [1] account for 4.5% of the global burden of disease [2]. Currently, there are nearly 1.5 billion people with hypertension [3], accounting for nearly 1/3 of the adult population, according to statistics from the International Society of Hypertension, the estimated number is even higher.

The rate of hypertension is different in each country, therefore in order to determine the general rate of hypertension in the world, the rate of blood pressure reaching the target, the rate of blood pressure awareness according to the geography and the level of economic development of the region, since 2017 the International Society of Hypertension has launched the May Measurement Month (MMM: May Measurement Month) campaign in many countries and regions, measuring an estimated 100 million people worldwide. In Vietnam, it started its first implementation in 2017 in ten provinces and cities nationwide.

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Nghe An is also a location where MMM is deployed annually.

To determine the rate of hypertension in the population, especially adults aged 18 and over, we measured blood pressure for people in the community for 5 years starting in 2016 and then in 2017. Initially implemented according to the plan of the International Society of Hypertension (ISH).

II. SUBJECTS AND METHODOLOGY

2.1. Design study

A cross-sectional descriptive study during 5 years, the blood pressure screening was conducted in Nghe An province from 2016 to 2020.

Measurement setting: We conduct the blood pressure measurements at locations recommended by the International Society of Hypertension (ISH), including measurements for people coming to the hospital in Vinh city, Vinh Medical University hospital, and measurements at train station, measured in the community for all 25 communes and wards in Vinh city.

2.2. Subjects

People aged 18 and over include both genders. Even people with blood pressure were included in the study. The total number of people screened is: 12,303 people

2.3. Study method

People are allowed to have a rest at least 5 minutes in the sitting position before the measurement. No coffee, alcohol, or cigarette is allowed. If people have used stimulants such as alcohol or coffee, they will be removed from the list to be measured.

Premeasuring, people were asked and filled in all the parameters according to the

pre-designed data collection form such as age, gender, height, weight, whether they had their blood pressure measured regularly or not, whether regular medication taking, alcohol abusing or not.

The measuring room is a cool, quiet place, the room temperature is around 300 C.

Participants were measured in a sitting position, measured 3 times with one-minute observation interval.

The measurement technician is a senior student and nursing staffs are thoroughly qualified in measuring training and data recording.

Hypertension diagnosis is done when systolic blood pressure ≥ 140 mmHg and/or DBP ≥ 90 mmHg. Isolated systolic hypertension is diagnosed when SBP ≥ 140 mmHg and DBP < 90 mmHg; Blood pressure classification is according to WHO/ISH 2003 and European Society of Hypertension, Vietnam Society of Hypertension 2016.

Target blood pressure is defined as a patient who has applied treatment measures: a combination of no drugs and antihypertensive drugs with blood pressure below 140/90 mHg.

2.4. Data processing and statistical analysis

Data were recorded and compiled according to the general format of MMM program of ISH. Data were processed by SPSS 20.0 software. Comparing ratios using Chisquare2, the difference is statistically significant when p value < 0.05 .

III. RESULTS

3.1. Basline characteristic

Table 3.1. Aged and gender characteristic

Ages	Female (1)		Male (2)		Total		p(1-2)
	n	%	n	%	n	%	
18-24	744	64.3	414	35.7	1158	9.4	<0.05
25-39	998	51.6	937	48.4	1935	15.7	
40-59	3170	60.5	2070	39.5	5240	42.6	
≥60	2336	58.8	1634	41.2	3970	32.3	
Total	7248	58.9	5055	41.1	12303	100	
Mean age	51.3 ±16.8		50.9 ±16.3		51.1±16.7		

The largest proportion of the population aged 40 and over were measured their blood pressure. Ages from 18 to 24 years old had the lowest measurement rate. The difference is statistically significant with $p < 0.05$.

Table 3.2. Athropometry characteristic

Variability	Female (1) X ±SD	Male (2) X ±SD	Total X ±SD	p (1-2)
Height (cm)	155.9 ± 7.3	161.8 ±7.1	158.8±7.8	< 0,01
Weight (kg)	53.5±8.3	58.2±9.5	55.4±9.1	<0.01
BMI (kg/m2)	22.01 ±3.1	22.2±3.3	22.1±3.2	>0,05

Height, weight between male and female is not statistically significant.

BMI between male and female is not statistically significant.

3.2. The percentage of hypertension

Table 3.3. Prevalence of hypertension across age groups in the study population

Ages	ndt	Female (1)			Male (2)			Total		nmt	Total	Total %	pdt
		ng	nTH A	%	ng	nTH A	%	nTH A	%				
18-24	1158	744	56	7.5	414	76	18.4	132	11.4	32	164	14.2	<0.01
25-39	1935	998	98	9.8	937	170	18.1	268	13.85	87	355	18.3	
40-59	5240	3170	592	18.7	2,070	604	29.2	1196	22.82	351	1547	29.5	
≥60	3970	2336	746	31.9	1,634	635	38.9	1381	34.79	375	1756	44.2	
Total	12303	7248	1492	20.6	5055	1485	29.4	2977	24.2	885	3862	31.4	
p (1-2)		<0.05											

ndt:: Number of subjects studied per age group; ng: Number of subjects studied per gender

nTHA: Frequency of hypertension; pdt: p-value based on age

nmt: Number of hypertensive subjects with controlled blood pressure

The prevalence of hypertension during measurements is 24.2%. The rate of achieving the target blood pressure is 7.2% (885 out of 12,303). The overall prevalence

of hypertension during the study period is 31.4%.

Hypertension rates increase with age. The age group 18-24 has the lowest hypertension rate, while those aged ≥ 60 have the highest. The differences are statistically significant with $p < 0.01$.

There is a statistically significant difference in hypertension rates between males and females with $p < 0.05$.

Table 3.4. Rates of Blood Pressure Increase

Ages	ndt	nTHA	Stage I		Stage II		Stage III		p(I-III)
			ng	%	ng	%	nTHA	%	
18-24	1158	132	125	94.7	7	5.3	0	0.0	(-)
25-39	1935	268	245	91.4	21	7.8	1	0.4	(-)
40-59	5240	1196	898	75.1	144	12.0	29	2.4	<0,01
≥60	3970	1381	1177	85.2	253	18.3	77	5.6	<0.01
Total	12303	2977	2445	82.1	425	14.3	107	3.6	<0.01

Among the entire cohort of patients identified during the screening, hypertension Stage I accounts for the highest proportion, exceeding 80%. The prevalence of Stage III hypertension gradually increases with age and is not observed in the adolescent age group of 18-24 years.

Table 3.5. Rates of Isolated Systolic Hypertension by Age

Ages	nTHAt	Female			Male			Total		p
		nTHA	ntt	%	nTHA	ntt	%	ntt	%	
18-24	132	56	22	39.3	76	41	53.9	63	47.7	>0.05
25-39	268	113	45	39.8	194	82	42.3	127	41.4	
40-59	1196	557	234	42.0	580	181	31.2	415	36.0	
≥60	1381	746	391	52.4	635	304	47.9	695	50.3	
Total	2977	1472	692	47.0	1485	608	40.9	1300	43.7	

nTHAt: Frequency of Isolated Systolic Hypertension by Age; ntt: Frequency of Isolated Systolic Hypertension.

Isolated Systolic Hypertension accounts for approximately 44%, with no significant difference observed across age groups.

3.3. Rates of Antihypertensive Medication Usage and Achievement of Blood Pressure Goals

Table 3.6. Proportion of Individuals with High Blood Pressure Using Antihypertensive Medications

Age	nTHAt	Female			Male			Total		p
		nTHAg	ndt	%	nTHAg	ndt	%	ndt	%	
18-24	132	56	15	26.8	76	21	27.6	36	27.3	<0.05
25-39	307	113	47	41.6	194	48	24.7	95	35.4	
40-59	1154	557	308	55.3	580	187	32.2	495	41.4	
≥60	1381	746	336	45.0	635	252	39.7	588	42.6	
Age	2977	1472	706	48.0	1485	508	34.2	1214	40.8	

(ndt: Number of individuals using antihypertensive medications)

Individuals aged 40 and over exhibit a higher prevalence of using medications for high blood pressure compared to those aged 18-39. This difference is statistically significant with $p < 0.05$. Notably, the 18-24 age group has the lowest rate of antihypertensive medication usage. Overall, only 40% of the population is utilizing antihypertensive medications.

Table 3.7. Proportion of Individuals Achieving Blood Pressure Goals among Those with Hypertension

Agei	nTHAt	Female			Male			Total		p
		nTHAg	nmt	%	nTHAg	nmt	%	nmt	%	
18-24	132	56	13	23.2	76	19	25.0	32	24.2	>0.05
25-39	307	113	47	41.6	194	38	19.6	85	27.7	
41-60	1154	557	251	45.1	580	113	19.5	364	31.5	
>60	1381	746	243	32.6	635	161	25.4	404	29.3	
Total	2977	1472	554	37.6	1485	331	22.3	885	29.7	

nTHA: Number of individuals with high blood pressure

nmt: Number of individuals achieving blood pressure goals

Less than one-third of individuals with high blood pressure have their blood pressure within the target range.

Table 3.8. Proportion of Individuals Achieving Blood Pressure Goals among Those with Hypertension Taking Medication

Age	nTHAt	Female			Male			Total			p
		ndt	nmt	%	ndt	nmt	%	ndt	nmt	%	
18-24	132	15	13	86.7	21	19	90.5	36	32	88.9	<0.05
25-39	307	47	47	100.0	48	38	79.2	95	85	89.5	
40-59	1154	308	226	73.4	187	113	60.4	495	364	73.5	
≥60	1381	336	228	67.9	252	161	63.9	588	404	63.8	
Total	2977	706	514	72.8	508	331	65.2	1214	885	72.9	

nTHA: Number of individuals with high blood pressure

ndt: Number of individuals with high blood pressure taking antihypertensive medication

nmt: Number of individuals achieving blood pressure goals

The rate of individuals achieving blood pressure goals among those taking medication is over 70%. The age group 18-39 has a significantly higher rate of achieving blood pressure goals compared to the group above 40.

3.4. Rate of Individuals Not Screened for Blood Pressure in the Last 12 Months

Table 3.9. Rate of individuals not screened for blood pressure in the last 12 months

Age	ndt	Female		Male		Total		p
		nd	%	nd	%	nd	%	
18-24	1158	502	43.4	266	23.0	768	66.3	>0.05
25-39	1935	586	30.3	540	27.9	1126	58.2	
40-59	5240	1949	37.2	1053	20.1	3002	57.3	
≥60	3970	1566	39.4	971	24.5	2537	63.9	
Total	12303	4603	37.4	2830	23.0	7433	60.4	

nd: Number of individuals screened for blood pressure in the last 12 months

The rate of individuals not screened for blood pressure in the last 12 months is over 60%. There is no significant difference across age groups.

IV. DISCUSSION

4.1. Baseline characteristic

Percentage of people having their blood pressure measured and screened at all 4 age

groups, the 40-59 age group has the highest rate of having their blood pressure measured. Ages 18-24 have the lowest rate of having blood pressure measured. Women are

screened more often than men, and the average age of people screened is significantly higher in women than in men. The difference is statistically significant ($p < 0.05$).

Height and weight in men are significantly higher than in women. BMI is different between men and women difference is not statistically significant.

4.2. Rates of Overall Hypertension and Rates of Isolated Systolic Hypertension

MMM data (May blood pressure measurement program in 2017 and 2018) of the Hypertension Society International blood pressure (ISH) shows the prevalence of hypertension varies across countries and regions, low-income countries, middle-income countries and high-income areas; The lowest rate of hypertension is the country Mauritius with 14.4% of a total of 2302 people measured in 2017 and 5471 people measured in 2018; The highest rate of hypertension is in Brazil with 67.9% out of a total of 19,673 people measured for both 2017 and 2018; Next are Pakistan and Poland with a high blood pressure rate of over 58% for both years' measurements.

MMM 2019 results in Hungary according to research by János Nemcsik and colleagues show that the prevalence of hypertension in Hungary is 46.5% (1286 hypertensive people/2766 screened participants) [5].

Patricia et al.'s 2004 study compiled 173 summarized studies and 41 studies from 39 countries. The results show that the rate of hypertension varies in different regions of the world. The lowest is in rural India with 3.4% in men and 6.8% in women; The highest in Poland is 68.9% in men and 72.5% in women [2].

The study by Katherine and colleagues gathered studies from 1995-2014, including

135 baseline population studies with 968,419 adults from 90 countries, showing that 31.1% of adults around the world have hypertension; 28.5% in high-income countries and 31.5% in middle-income countries [3].

In Vietnam, MMM data for 2 years 2017-2018 showed that the rate of hypertension was 30.3 out of a total of 28,325 people measured [1].

Research by Huynh Van Minh and colleagues in 2019 screening under the MMM program on 25,887 adults showed that the rate of hypertension in 2019 was 33.8%, higher than in 2018 (30.3%) and 2017 (28.7%) [4].

Our research results in table 3.3 show that the rate of hypertension at the time of the study was 24.2%, the rate of achieving treatment target blood pressure in the population was 7.2%, and the overall rate of hypertension from 2016-2020, the research population in Nghe An area is 31.4%.

The rate of hypertension also increases with age. The older the age, the higher the rate of hypertension is. This issue has been proven by many studies. Research by Nguyen Thanh Binh in 2017 [8] showed that the age group 25-34 had 2.9%, while the age group 55-64 accounted for 14.2%. Our research results in table 3.4 show that the rate of hypertension also increases with age. The older the age, the higher the rate of hypertension. The lowest is the age 18-24, the highest is the age 60 or older.

Isolated systolic hypertension is a blood pressure feature in the elderly. Research by Le Van Hoi [7] on 369 elderly people in some rural areas of Vietnam showed that the rate of isolated systolic hypertension in the elderly was 19.2%. Our research results in table 3.5 show that the rate of isolated

systolic hypertension is 43.7% and does not differ between ages.

4.3. Rates of antihypertensive medication treatment and attainment of target blood pressure

The evaluation of treatment efficacy and the attainment of treatment goals serve as a crucial criterion in assessing preventative strategies against cardiovascular events, with numerous studies dedicated to this pivotal area.

In a comprehensive study by Patricia and her collaborators, synthesizing data from 173 research endeavors and drawing insights from 41 studies spanning 39 nations, the observed hypertension treatment rates exhibited notable variations, ranging from 10.7% in Mexico to a substantial 66% in Barbados. Simultaneously, the percentage of individuals achieving the target blood pressure of <140/90mmHg during antihypertensive medication varied from 5.4% in South Korea to a noteworthy 58% in Barbados [2].

Katherine and her research team conducted an expansive study involving 968,419 adults across 90 countries. The findings indicated that the hypertension treatment rate was 44.5% in middle-income countries, escalating to 55.6% in high-income nations. Furthermore, the proportion of patients successfully managing their blood pressure within the specified treatment goals stood at 17% in middle-income countries, contrasting with 28.4% in high-income countries [3].

Within the Vietnamese context, data from the National Hypertension Control Program unveils substantial gaps, with 30% of individuals cognizant of their hypertension remaining untreated. Additionally, a staggering 64% of those undergoing

hypertension treatment fail to attain their target blood pressure [6].

A study by Huynh Van Minh et al. in 2019, employing the MMM 2019 program to screen 25,887 adults in various provinces of Vietnam, disclosed that 65.5% of adults aged 18 and above utilized antihypertensive medications. Among this cohort, 51.2% achieved blood pressure control out of those under medication. However, when considering the entire hypertensive population, the attainment of control was notably lower at 33.5% [4].

In our investigation, the hypertension treatment rate stood at 40.8%, with individuals aged over 60 exhibiting the highest treatment rate at 42.6%, while those in the 18-24 age group displayed a comparatively lower treatment rate of 27.3%. These disparities demonstrate statistical significance.

The aggregate rate of achieving the overarching blood pressure target across the entire hypertensive population is 29.7%. Notably, the rate of reaching the target among individuals utilizing antihypertensive medications is substantially higher at 72.9%.

4.4. Rates of blood pressure measurement at least once in the last 12 months

This rate can be considered a pertinent health criterion for the population and their healthcare accessibility.

A study by Anuj Maheshwari et al., involving the screening of 345,234 individuals with an average age of 42.6 ± 16.0 , demonstrated that 64% of subjects had their blood pressure measured for the first time in their lives, with only 28.1% having measurements taken within the last 12 months [8].

In Vietnam, a research effort led by Nguyen Thanh Binh in 2017, comprising 1,200 individuals aged 25 and above in Kherme, revealed a blood pressure measurement rate of 63.2% within the last 12 months [9]. In our study, the percentage of individuals undergoing blood pressure measurement at least once in the past year was 60.4%.

V. CONCLUSION

Nearly one-third of the adult population aged 18 and above is affected by hypertension. The rate of individuals receiving treatment for hypertension is relatively low (40.8%). The attainment of target blood pressure among those with hypertension is also notably limited.

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