

Cardiovascular disease risk factors and blood pressure control in ambulatory care visits to physician offices in the U.S.

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Introduction

Cardiovascular disease is the leading cause of mortality in the U.S. Risk factors identified for cardiovascular disease include uncontrolled blood pressure, diabetes, renal disease, hyperlipidemia, obesity, and tobacco use. The threshold for pharmacologic treatment of hypertension in patients with diabetes or chronic kidney disease is $\geq 130/80$ mmHg. It may be of benefit to extend these criteria to individuals who have other cardiovascular disease risk factors and no diagnosis of hypertension. Blood pressure recommendations in this population have largely been unstudied.

Hypothesis

- We hypothesized that in the non-hypertensive population with one or more cardiovascular disease risk factors there would be a greater number of patient office visits with blood pressure measurements $\geq 130/80$ mmHg.
- Additionally, we hypothesized that the non-hypertensive population would have blood pressure control rates higher than national percentages which include hypertensive individuals.

Materials and methods

- We analyzed 2006 National Ambulatory Medical Care Survey (NAMCS) data ($n=29,392$ patient record forms) to determine blood pressure control at physician office visits in the U.S. among patients with cardiovascular disease risk factors and no diagnosis of hypertension.
- Patient record forms with a documented diagnosis of hypertension were excluded from our study ($n=6,648$), leaving 22,744 records for our analyses.
- Characteristics of the non-hypertensive population were identified and classified by blood pressure above or below $140/90$ mmHg.
- Cardiovascular disease risk factors included in the survey were diabetes, renal disease, hyperlipidemia, obesity, tobacco use, males >55 years, and females >65 years. This population was then classified by blood pressure above or below $130/80$ mmHg.
- The publicly available data was loaded into SQL server tables. Microsoft Access 2007 was then utilized to link to those tables. SQL queries were written and performed.

Results

Table 1: Characteristics of physician office visits with no diagnosis of hypertension classified by blood pressure above or below $140/90$ mmHg, NAMCS 2006.

Characteristic	Blood pressure Systolic ≥ 140 or Diastolic ≥ 90	Percent of total	Blood pressure Systolic < 140 and Diastolic < 90	Percent of total	Totals	P-value*
Number of Visits	12920	56.8%	9824	43.2%	22744	
Male	5787	63.5%	3325	36.5%	9112	$<.0001$
Female	7133	52.3%	6499	47.7%	13632	
Hispanic	1723	52.5%	1559	47.5%	3282	$<.0001$
Non-Hispanic	11197	57.5%	8265	42.5%	19462	
Age < 35	5256	56.2%	4104	43.8%	9360	$<.0001$
Age 35-64	4984	54.1%	4222	45.9%	9206	
Age ≥ 65	2680	64.1%	1498	35.9%	4178	

*Values for male vs. female, Hispanic vs. non-Hispanic, and age respectively.
Table 1: Patients with blood pressure $\geq 140/90$ mmHg comprised the majority of the population, found in 56.8% of visits. Patients with blood pressure $\geq 140/90$ mmHg had more office visits amongst all groups. Patients were mostly female, non-Hispanic and age < 65 years.

Figure 1: Cardiovascular disease risk factors in physician office visits with no diagnosis of hypertension, classified by blood pressure above or below $130/80$ mmHg

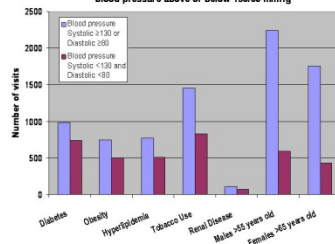


Figure 1: Patients with BP $\geq 130/80$ mmHg had more office visits in each group. This trend is most evident for males >55 years, females >65 years, and tobacco use risk factors.

Figure 2: Cardiovascular disease risk factors in physician office visits with no diagnosis of hypertension by percent of each group, classified by blood pressure above or below $130/80$ mmHg

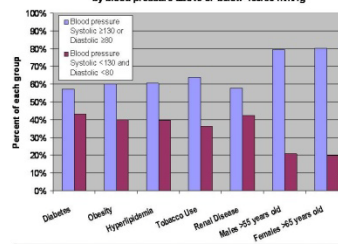


Figure 2: 80% of female patients >65 years had BP $\geq 130/80$ mmHg. Greater than 50% of patients in each group had BP $\geq 130/80$ mmHg. A greater percentage of patients with obesity, hyperlipidemia, tobacco use, male >55 years, and female >65 years had BP $\geq 130/80$ mmHg compared to diabetes or renal disease.

Table 2: Cardiovascular disease risk factors in physician office visits with no diagnosis of hypertension by percentage of total study population ($n=22,744$), NAMCS 2006*

Number of risk factors	Blood pressure Systolic ≥ 130 or Diastolic ≥ 80	Percentage of total $n=22744$	Blood pressure Systolic < 130 and Diastolic < 80	Percentage of total $n=22744$	Totals	Percentage of total $n=22744$
1 risk factor	5175	22.8%	2185	9.6%	7360	32.4%
2 risk factors	1091	4.8%	514	2.3%	1605	7.1%
3 risk factors	204	0.9%	122	0.5%	326	1.4%
4 risk factors	23	0.1%	23	0.1%	46	0.2%
5 risk factors	0	0.0%	1	0.0%	1	0.0%

*CVD risk factors include diabetes, obesity, hyperlipidemia, tobacco use, renal disease, male >55 years, and female >65 years.

Table 2: Patients with at least one cardiovascular disease risk factor and BP $\geq 130/80$ mmHg comprised 22.8% of the total non-hypertensive study population. 32.4% of the total non-hypertensive study population had at least one cardiovascular disease risk factor.

Conclusions

- 56.8% of those with no diagnosis of hypertension had elevated blood pressure according to current criteria (Table 1).
- BP control rate in our non-hypertensive population was 43.2% (Table 1), surprisingly similar to hypertensive populations (not consistent with our hypothesis) and demonstrating the need for improvement in awareness and onset of treatment.
- There were more patient office visits with BP $\geq 130/80$ mmHg in each group of cardiovascular disease risk factors when compared to BP $< 130/80$ mmHg (Figure 1), consistent with our hypothesis.
- At least one cardiovascular disease risk factor and BP $\geq 130/80$ mmHg was present in 22.8% of the non-hypertensive population (Table 2).
- A greater percentage of patients with obesity, hyperlipidemia, tobacco use, male >55 years, or female >65 years had BP $\geq 130/80$ mmHg when compared to patients with diabetes or renal disease (Figure 2). It may be of benefit to extend the threshold for pharmacologic treatment of hypertension to $\geq 130/80$ mmHg for patients with these additional cardiovascular disease risk factors.

Literature cited

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