

محمّد

Epidemiology of HTN



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سيزدهمین کنگره قلب و عروق خاورمیانه و پنجمین کنگره مداخلات پیچیده قلبی



<https://www.sciencedirect.com/science/article/pii/S0140673621013301>

► Hypertension significantly increases the **risk** of heart, brain and kidney diseases, and is one of the top causes of **death** and disease throughout the world. It can be **easily detected** through measuring blood pressure, at home or in a health center, and can often be **treated effectively** with medications that are **low cost**.

Approximately **54%** of stroke, **47%** of ischemic heart disease and **25%** of other CVD worldwide was attributable to high BP. For those ages 40 to 70, each increment of **20 mmHg** in systolic BP or **10 mmHg** diastolic BP **doubles** the risk of CVD across the BP range of 115/75 to 185/115 mm Hg .

Uncontrolled hypertension causes premature death.

It increases the risk of:



Heart attack



Stroke



Kidney failure



Blindness



Other complications

World Health Organization and Imperial College London joint press release:

- ▶ By analysing this The study, conducted by a global network of physicians and researchers, covered the period **1990-2019**. It used blood pressure measurement and treatment data from over **100 million people aged 30-79** years **in 184 countries**, together covering 99% of the global population, which makes it the most comprehensive review of global trends in hypertension to date.
- ▶ <https://www.who.int/news/item/25-08-2021-more-than-700-million-people-with-untreated-hypertension>
- ▶ <https://www.sciencedirect.com/science/article/pii/S0140673621013301>

▶ massive amount of data, the researchers found that there was **little change** in the **overall rate** of hypertension in the **world from 1990 to 2019**, but the **burden** has shifted from **wealthy nations to low- and middle-income countries**. The rate of hypertension has **decreased in wealthy** countries - which now typically have some of the lowest rates - but has increased in many low- or middle-income countries.

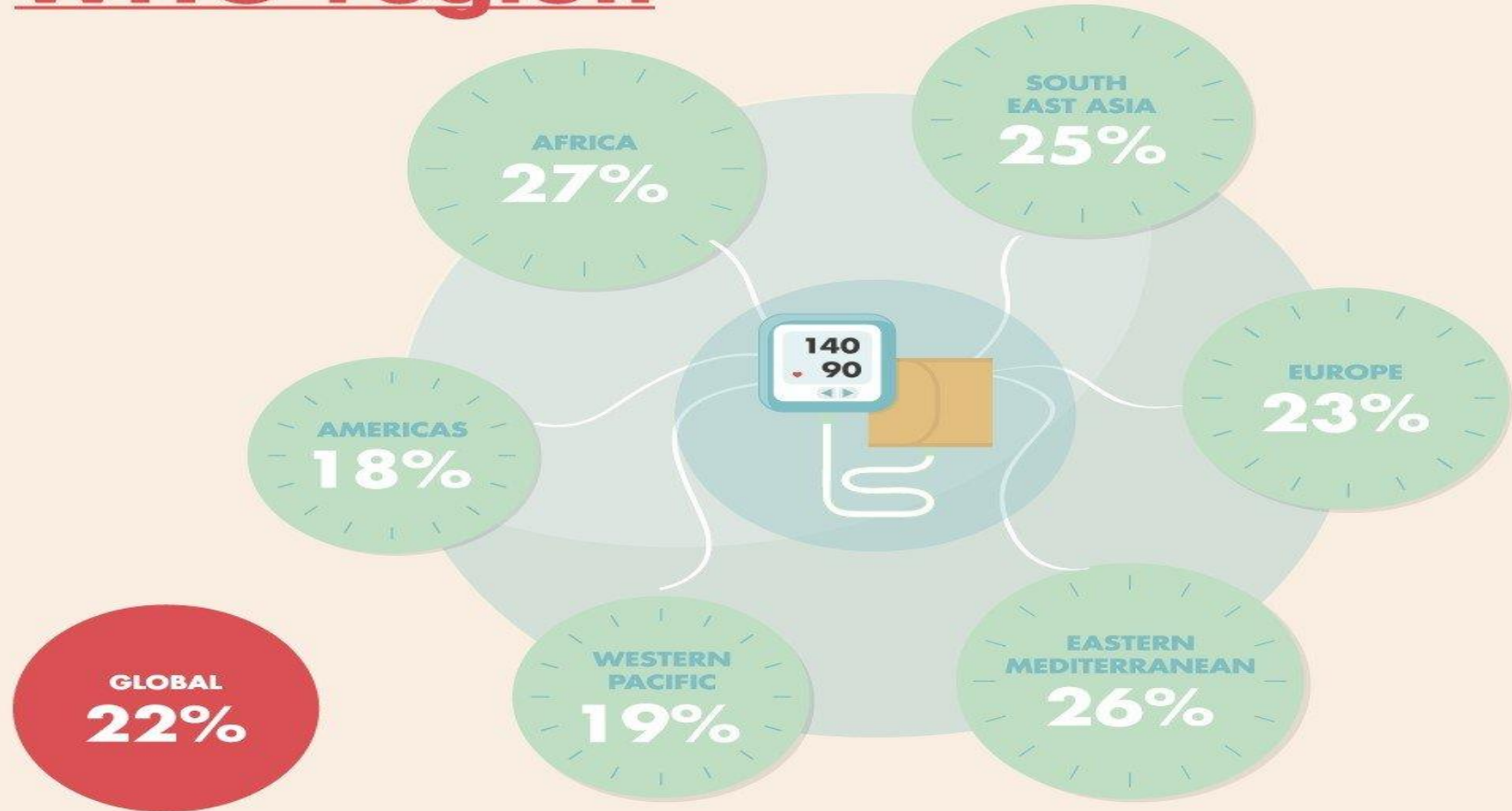
▶ The number of adults **aged 30–79** years with hypertension has increased **from 650 million to 1.28 billion in the last thirty years** according to the first comprehensive global analysis of trends in hypertension prevalence, detection, treatment and control, led by Imperial College London and WHO, and published today in *The Lancet*. Nearly half these people did not know they had hypertension.

▶ <https://www.sciencedirect.com/science/article/pii/S0140673621013301>

▶ <https://www.who.int/news/item/25-08-2021-more-than-700-million-people-with-untreated-hypertension>

- ▶ Although the **percent** of people who have hypertension **has changed little** since 1990, the **number** of people with hypertension doubled to 1.28 billion. This was primarily due to **population growth** and **ageing**. In 2019, over one billion people with hypertension (**82%** of all people with hypertension in the world) lived in **low- and middle-income** countries.
- ▶ <https://www.sciencedirect.com/science/article/pii/S0140673621013301>
- ▶ <https://www.who.int/news/item/25-08-2021-more-than-700-million-people-with-untreated-hypertension>

Hypertension prevalence by WHO region



Most people with
high blood pressure

DO NOT KNOW THEY HAVE IT.



1 in 5

women have hypertension

Most people with
high blood pressure

DO NOT KNOW THEY HAVE IT.



1 in 4

men have hypertension

Significant gaps in diagnosis and treatment

- ▶ About **580 million** people with hypertension (**41% of women and 51% of men**) were **unaware** of their condition because they were never diagnosed.
- ▶ The study also indicated that **more than half** of people (**53% of women and 62% of men**) with hypertension, or a total **720 million people**, were not **receiving the treatment** that they need. Blood pressure was **controlled**, which means medicines were **effective** in bringing blood pressure to normal ranges, in fewer than **1 in 4 women** and **1 in 5 men** with hypertension.
- ▶ <https://www.sciencedirect.com/science/article/pii/S0140673621013301>
- ▶ <https://www.who.int/news/item/25-08-2021-more-than-700-million-people-with-untreated-hypertension>

Top 10 countries with the **lowest** hypertension prevalence in 2019

WOMEN

▶ Ranking	Country	Prevalence as % of population
▶ 1.	Switzerland	17%
▶ 2.	Peru	18%
▶ 3.	Canada	20%
▶ 4.	Taiwan (Province of China)	21%
▶ 5.	Spain	21%
▶ 6.	Republic of Korea	21%
▶ 7.	Japan	22%
▶ 8.	United Kingdom	23%
▶ 9.	China	24%
▶ 10.	Iceland	24%

MEN

▶ Ranking	Country	Prevalence as % of population
▶ 1.	Eritrea	22%
▶ 2.	Peru	23%
▶ 3.	Bangladesh	24%
▶ 4.	Canada	24%
▶ 5.	Ethiopia	25%
▶ 6.	Solomon Islands	25%
▶ 7.	Papua New Guinea	25%
▶ 8.	Lao PDR	26%
▶ 9.	Cambodia	26%
▶ 10.	Switzerland	26%

Top 10 countries with the highest hypertension prevalence in 2019

WOMEN

▶ Ranking population	Country	Prevalence as % of
▶ 1.	Paraguay	51%
▶ 2.	Tuvalu	51%
▶ 3.	Dominica	50%
▶ 4.	Dominican Republic	49%
▶ 5.	Sao Tome and Principe	48%
▶ 6.	Jamaica	48%
▶ 7.	Haiti	48%
▶ 8.	Iraq	48%
▶ 9.	Eswatini	47%
▶ 10.	Botswana	47%

MEN

▶ Ranking population	Country	Prevalence as % of
▶ 1.	Paraguay	62%
▶ 2.	Hungary	56%
▶ 3.	Poland	55%
▶ 4.	Argentina	54%
▶ 5.	Lithuania	54%
▶ 6.	Romania	53%
▶ 7.	Belarus	52%
▶ 8.	Croatia	51%
▶ 9.	Tajikistan	51%
▶ 10.	Serbia	50%

Top 10 countries with the highest hypertension treatment rate in 2019

WOMEN

▶ Ranking	Country	Rate as % of all women with hypertension
▶ 1.	Republic of Korea	77%
▶ 2.	Costa Rica	76%
▶ 3.	Kazakhstan	74%
▶ 4.	United States of America	73%
▶ 5.	Iceland	72%
▶ 6.	Venezuela	71%
▶ 7.	El Salvador	71%
▶ 8.	Portugal	71%
▶ 9.	Canada	71%
▶ 10.	Slovakia	70%

MEN

▶ Ranking	Country	Rate as % of all men with hypertension
▶ 1.	Canada	76%
▶ 2.	Iceland	71%
▶ 3.	Republic of Korea	67%
▶ 4.	United States of America	66%
▶ 5.	Kazakhstan	66%
▶ 6.	Malta	65%
▶ 7.	Costa Rica	63%
▶ 8.	Germany	61%
▶ 9.	Czechia	59%
▶ 10.	Singapore	59%

Top 10 countries with the lowest hypertension treatment rate in 2019

WOMEN

▶ Ranking	Country	Rate as % of all women with hypertension
▶ 1.	Rwanda	11%
▶ 2.	Niger	15%
▶ 3.	Kiribati	15%
▶ 4.	Ethiopia	16%
▶ 5.	Vanuatu	16%
▶ 6.	Tanzania	17%
▶ 7.	Solomon Islands	17%
▶ 8.	Madagascar	19%
▶ 9.	Mozambique	19%
▶ 10.	Kenya	21%

MEN

▶ Ranking	Country	Rate as % of all men with hypertension
▶ 1.	Rwanda	10%
▶ 2.	Kenya	10%
▶ 3.	Mozambique	10%
▶ 4.	Vanuatu	11%
▶ 5.	Solomon Islands	11%
▶ 6.	Niger	12%
▶ 7.	Madagascar	13%
▶ 8.	Uganda	13%
▶ 9.	Togo	14%
▶ 10.	Burkina Faso	14%

National Non Communicable Diseases Surveillance Survey: NCDSS (STEPs 2016)

<https://vizit.report/panel/stepsFactSheet/fa/main.html#/map>

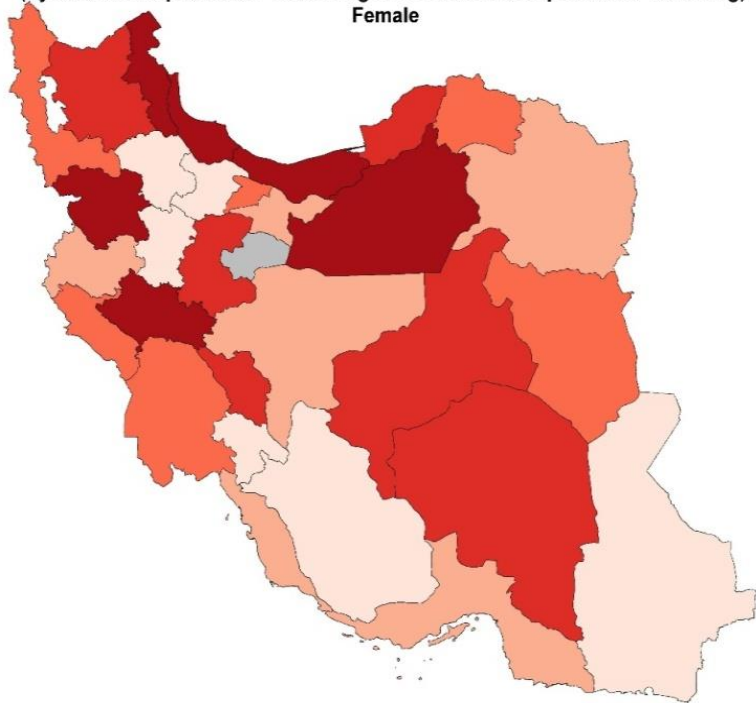
Iranian perspective

- ▶ The national surveillance STEP wise study that was done by the Ministry of Health (MOH) demonstrated a prevalence of **25%** for HTN among adults aged **25-64 years**. On the other hand, HTN was introduced as the **strongest risk factor** for CVD events in an Iranian population.
- ▶ According to available data from Iran, **awareness and control rate of hypertension** is generally **low**. Many studies estimated the awareness of hypertension in Iranians to be approximately **50%**, while the control rate of hypertension is **less than 16%**.

female

28.19%

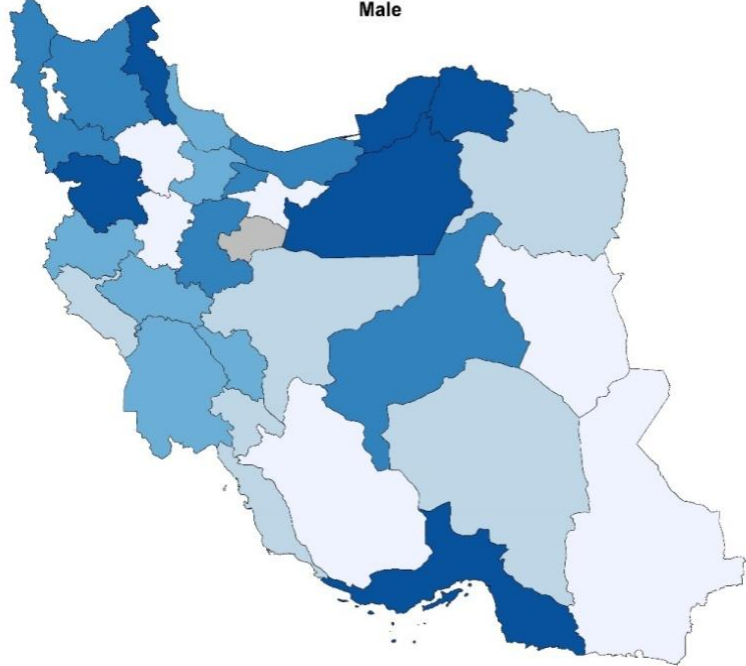
Hypertension
(Systolic blood pressure > 140 mmHg or Diastolic blood pressure > 90 mmHg)
Female



25.73%

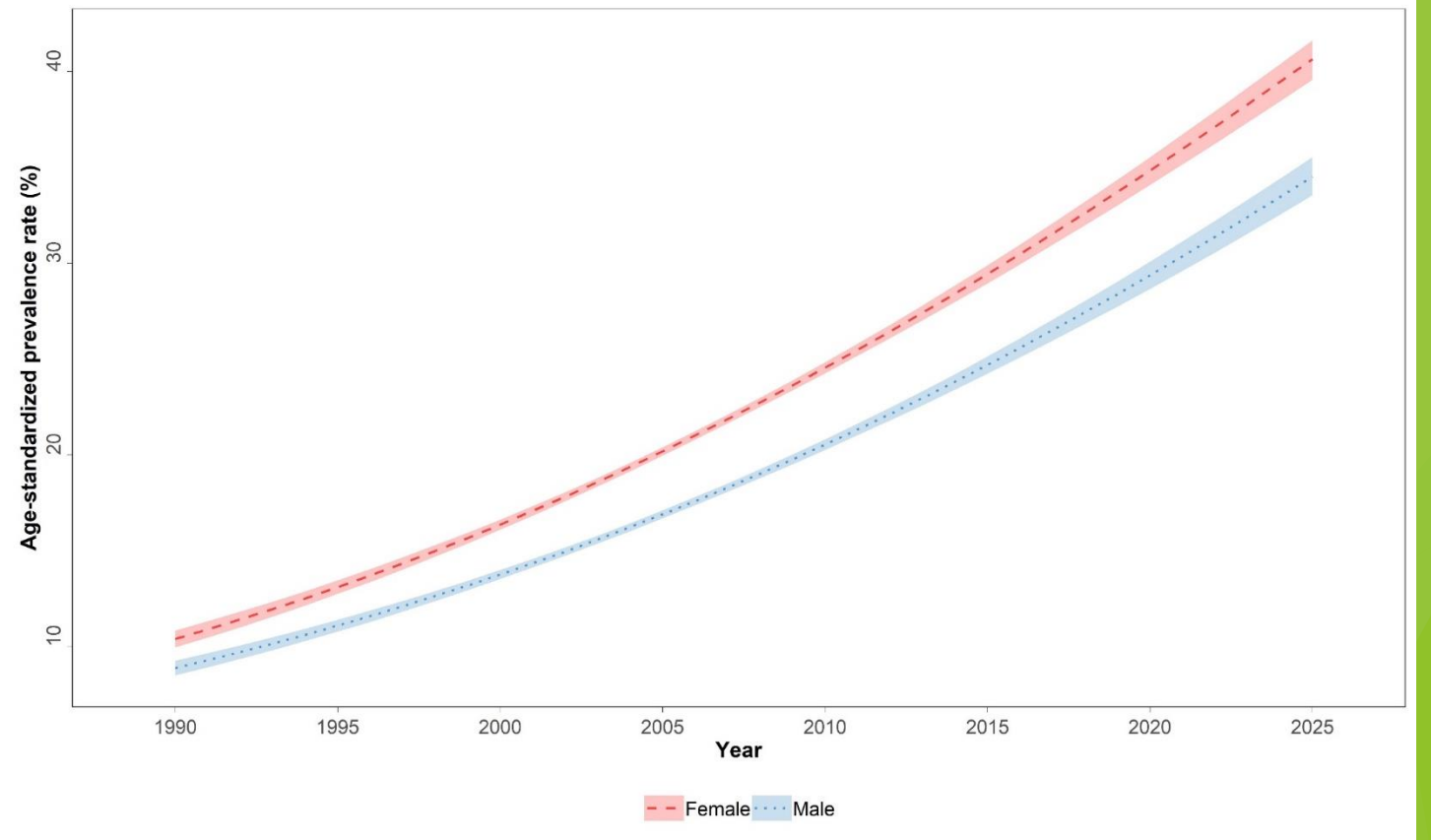
male

Hypertension
(Systolic blood pressure > 140 mmHg or Diastolic blood pressure > 90 mmHg)
Male

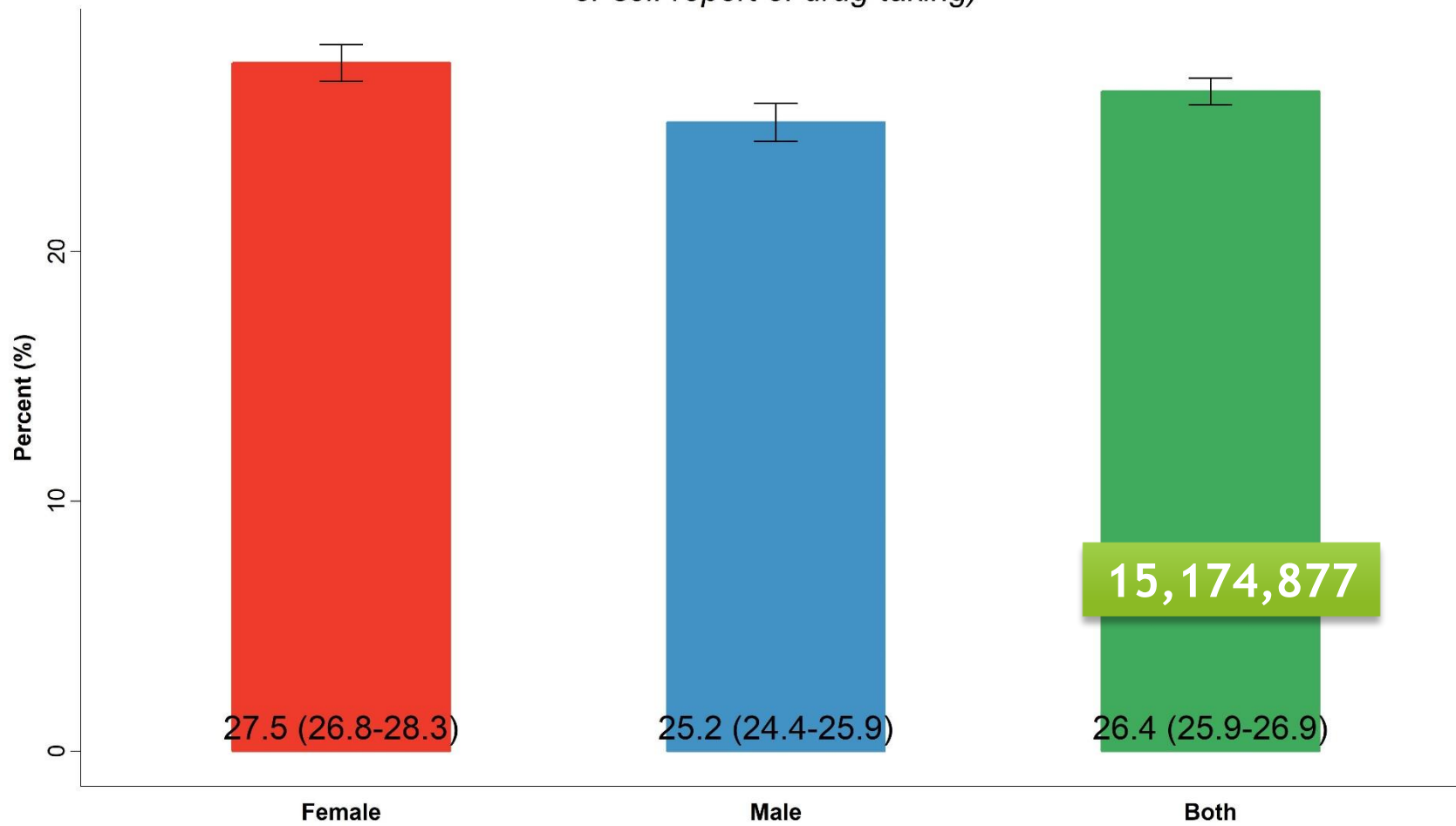


روند زمانی میزان استاندارد شده سنی شیوع فشار خون بالا از سال 1990 تا 2025

N	شیوع استاندارد شده سنی	year	sex
853,346	10.4%	1990	FEMALE
790,508	8.9%		MALE
6,819,117	29.4%	2015	FEMALE
5,791,961	24.7%		MALE
11,847,996	40.6%	2025	FEMALE
10,106,661	34.5%		MALE



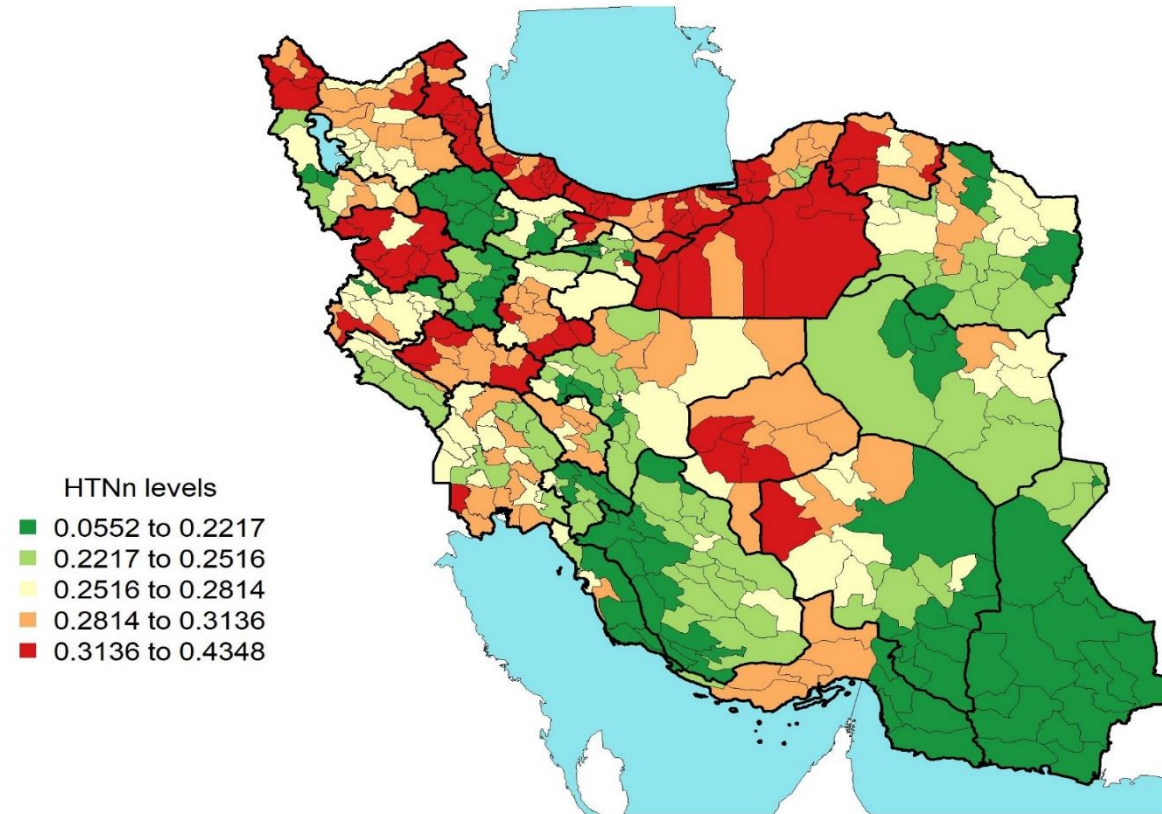
*Hypertension
(Systolic blood pressure \geq 140 mmHg or Diastolic blood pressure \geq 90 mmHg
or self report of drug-taking)*



Age-gender comparison of hypertension (HTN) prevalence, **Isfahan, Iran, 2016**

Age (yr)	<i>NORMOTENSIVE</i>	PRE hypertension	HTN	Total
	N(%)	N(%)	N(%)	
18-29	501(69.8%)	191(26.6%)	26(3.6%)	718(100%)
30-39	324 (66.7%)	144(29.6%)	18(3.7%)	486(100%)
40-49	189(54.5%)	102(29.4%)	56(16.1%)	347(100%)
50-59	109(38.9%)	80 (28.6%)	91(32.5%)	280(100%)
60-69	30(19.4%)	37(23.9%)	88(56.8%)	155(100%)
70↑	14(11.6%)	22(18.2%)	85(70.2%)	121(100%)
Total	1167(55.4%)	576(27.3%)	364(17.3%)	2107(100)

شیوع فشار خون بالا به تفکیک شهرستان در سال ۲۰۱۶



prevalence of HTN (aged \geq 18 years old)

Systolic blood pressure \geq 140 mmHg or diastolic blood pressure \geq 90 mmHg or self-report of drug taking

Province	Female	Male
Sistan and Balouchestan	19.3	19.4
Kohkiluye and Bouyer Ahmad	20.7	23.1
Hamedan	22.2	21
Fars	22.2	22.3
Zanjan	22.9	18.5
Hormozgan	23.3	29.6
Qazvin	23.7	25.6
Boushehr	24.4	21.3
Tehran	24.6	22
Khorasan_razavi	26.2	24.1
Isfahan	26.6	23.4
Kermanshah	27.3	25.8
Kerman	27.3	21
Qom	27.7	24.1
Khorasan_South	27.8	21.8
Azarbayjan_West	27.9	26.8
Khuzestan	28.2	25.6
Ilam	28.2	24.4
Alborz	28.5	28.3
Khorasan_North	29.4	30.8
Azararbayjan_East	29.7	28.3
Chaharmahal	30	26.6

prevalence of HTN (aged ≥ 18 years old)

Systolic blood pressure ≥ 140 mmHg or diastolic blood pressure ≥ 90 mmHg or self-report of drug taking

Province	Female	Male
Yazd	31.6	29.8
Golestan	31.9	31.7
Markazi	32	26.8
Kordestan	32.3	37.5
Semnan	35.4	34.9
Gilan	35.8	26.5
Lorestan	35.9	25.9
Mazandaran	36	29.8
Ardebil	37	31.7

A thick, hand-painted yellow circle with visible brushstrokes, serving as a background for the text.

**Know your
Blood Pressure**

Hypertension awareness (aged ≥ 18 years old)

Awareness of individuals diagnosed with hypertension based on self-report

Province	Female	Male
	Prevalence (%)	Prevalence (%)
Markazi	74.3	46
Isfahan	74	56.3
Hamedan	73.9	42.1
Kerman	73.2	54.9
Khorasan_North	72.7	42.9
Kohkiluye and Bouyer Ahmad	72.5	68.3
Sistan and Balouchestan	72.3	56.9
Fars	70.8	52.6
Semnan	69.7	48.8
Ardebil	68.7	52.6
Khorasan_razavi	67.5	52.5
Azərbayjan_West	67.3	50.2
Chaharmahal	67.2	47.8
Qom	66.5	47.3
Yazd	65.4	56.2
Tehran	65.2	47.9
Azararbayjan_East	64	42.9
Zanjan	63.7	37.9
Lorestan	62.1	43.8
Mazandaran	61.4	42.1

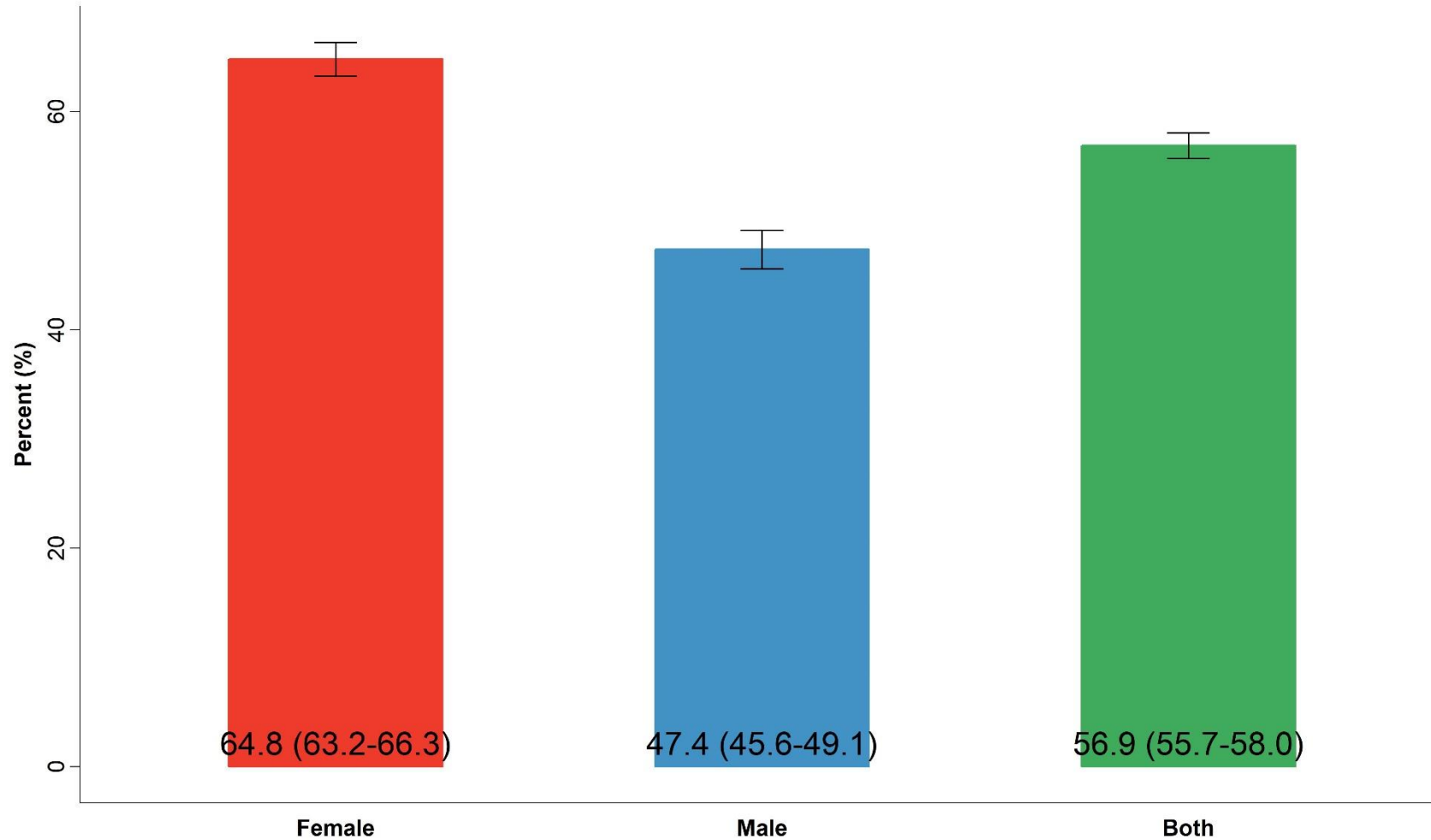
Hypertension awareness (aged ≥ 18 years old)

Awareness of individuals diagnosed with hypertension based on self-report

Province	Female	Male
Kordestan	59.8	31.2
Khuzestan	58.3	43
Gilan	58	42.6
Ilam	56.2	51.8
Hormozgan	56	22.7
Qazvin	54.8	41.2
Kermanshah	53.5	48.2
Khorasan_South	50.2	41.6
Boushehr	47.2	29.1

شیوع آگاهی از فشار خون بالا به تفکیک جنسیت در سال ۲۰۱۶

Hypertension awareness



تنها ۵۶.۹٪ از افراد مبتلا به فشار خون بالا از بیماری خود اطلاع داشته اند.

effective care for Hypertension (aged ≥ 18 years old)

Systolic blood pressure < 140 mmHg and diastolic blood pressure < 90 mmHg for those treated individuals with hypertension

Province	Female	Male
	Prevalence (%)	Prevalence (%)
Fars	62.7	45.3
Ilam	52.3	36.9
Semnan	46.6	43.1
Yazd	45.7	42.2
Kerman	43	35.3
Qazvin	40	30.3
Khorasan_South	39.7	40
Kohkiluye and Bouyer Ahmad	39.5	20.7
Azararbayjan_East	39	39
Tehran	38.6	42.8
Markazi	38.4	31
Isfahan	37.7	44.2
Khorasan_razavi	37.3	35.4
Sistan and Balouchestan	36.4	55.7
Gilan	36.3	40.9
Khorasan_North	35.9	45.6
Qom	35.5	41.5
Chaharmahal	35.4	46.3
Azarbayjan_West	34.8	44.3
Hormozgan	34.6	50

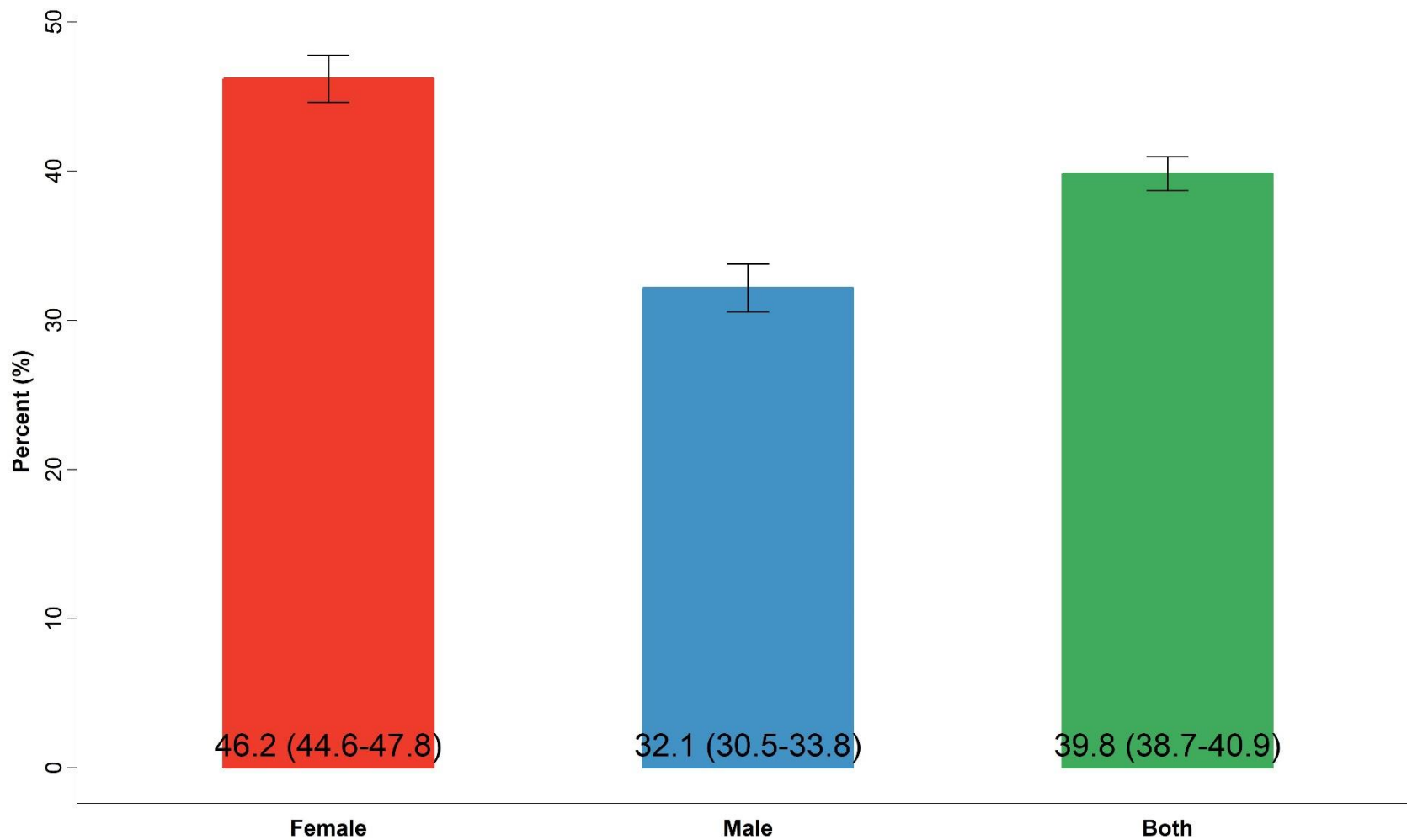
effective care for Hypertension (aged ≥ 18 years old)

Systolic blood pressure < 140 mmHg and diastolic blood pressure < 90 mmHg for those treated individuals with hypertension

Province	Female	Male
Golestan	31.5	26.8
Alborz	31.3	30.7
Kermanshah	29.8	19.9
Zanjan	29.5	33.1
Lorestan	27.8	47.1
Mazandaran	26	48.2
Khuzestan	24.8	41.3
Kordestan	24.7	34.1
Boushehr	23.1	23.5
Hamedan	19	42.3

شیوع دریافت درمان مرتبط با فشار خون بالا به تفکیک جنسیت در سال ۲۰۱۶

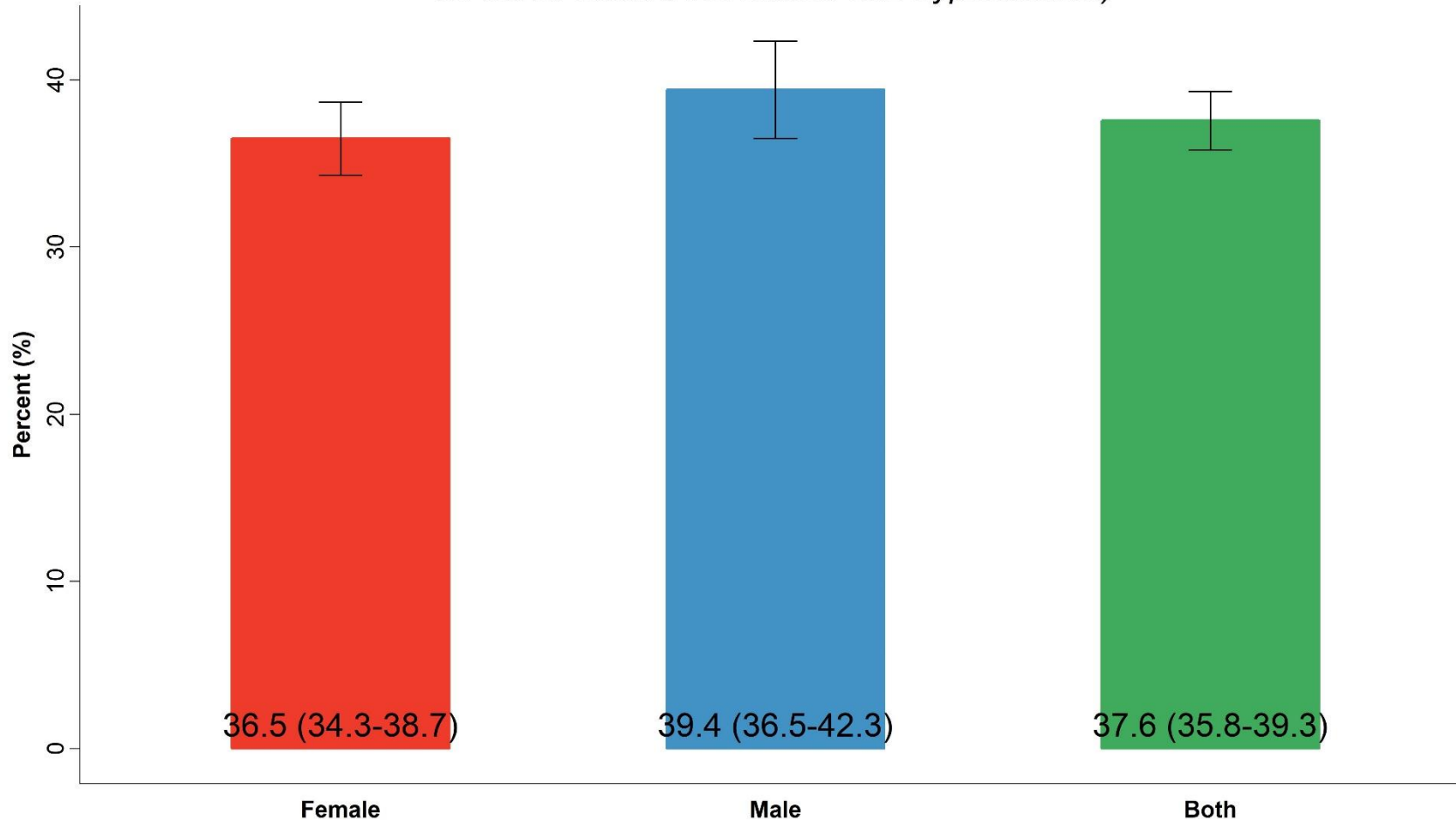
Receiving care for hypertension



۳۹.۸٪ از افراد داروی مرتبط به فشار خون بالا را دریافت کرده اند.

شیوع دریافت درمان موثر مرتبط با فشار خون بالا به تفکیک جنسیت در سال ۲۰۱۶

*Effective care
(Systolic blood pressure < 140 mmHg and Diastolic blood pressure < 90 mmHg
for those treated individuals with hypertension)*



**۳۷.۶٪ از افراد
مبتلا به فشار خون
بالا درمان موثر
دریافت کرده اند.**

Risk Factors for High Blood Pressure

- Age
- Race
- Family history
- Obesity
- Inactivity
- Tobacco use
- Sodium intake
- Alcohol intake



Hypertension Risk Factors

Overweight, Unhealthy diet, Alcohol use, Low physical activity, Smoking, Stress, Certain Medicines, Certain chronic conditions, Low vitamin D, Aging, Family history, Gender, and Prehypertension.



Obesity: Body mass index \geq 30 kg/m²

Province	Female	Male
	Prevalence (%)	Prevalence (%)
Mazandaran	44	19.9
Ardebil	40.7	18
Semnan	40	16.8
Azarbayjan_West	37.7	18.1
Gilan	36.8	16.9
Golestan	35.8	23.2
Qazvin	35.2	16.1
Alborz	33	19.5
Azararbayjan_East	32.1	16.2
Markazi	32	11.9
Kordestan	31.7	14.7
Zanjan	30.7	11.2
Lorestan	30.6	14
Khuzestan	30.1	19.3
Qom	30.1	13.8
Yazd	30.1	18.1
Kohkiluye and Bouyer Ahmad	29.8	9.9

Obesity: Body mass index \geq 30 kg/m²

Province	Female	Male
Kermanshah	28.8	13.1
Tehran	28.5	15.5
Hamedan	28	14.2
Fars	27.9	12.8
Isfahan	27.7	17.1
Khorasan_razavi	26.8	14.2
Chaharmahal	25.4	13.5
Boushehr	24.8	13.1
Khorasan_North	22.5	14.3
Kerman	22.2	11.1
Khorasan_South	20.7	14.3
Ilam	19.7	5.6
Sistan and Balouchestan	17.6	5.2
Hormozgan	16.2	8.2

Hypercholesterolemia (aged \geq 25 years old): Total
cholesterol \geq 200 mg/dl or self-report of drug taking

Province	Female	Male
	Prevalence (%)	Prevalence (%)
Kohkiluye and Bouyer Ahmad	14.8	8
Sistan and Balouchestan	16.2	14.1
Qazvin	17.8	12
Zanjan	19.3	10.2
Khorasan_South	21.2	15.1
Kordestan	22.2	20.8
Qom	23.2	16.7
Chaharmahal	23.5	16.5
Fars	23.6	17.2
Ilam	23.8	13
Khorasan_North	24	16.3
Khorasan_razavi	24.2	17.9
Hamedan	24.4	19.4
Tehran	24.4	18
Kermanshah	24.6	15
Azararbayjan_East	24.8	25
Semnan	25.1	24.7
Boushehr	25.3	15.7

Hypercholesterolemia (aged \geq 25 years old): Total
 cholesterol \geq 200 mg/dl or self-report of drug taking

Province	Female	Male
Khuzestan	25.5	23.1
Markazi	25.7	14.8
Azərbayjan_West	26.4	19.8
Yazd	27	18.9
Isfahan	27.3	21.9
Kerman	27.7	20.2
Gilan	27.9	21.4
Alborz	28.2	21.6
Ardebil	28.9	17.5
Golestan	29.5	22.3
Hormozgan	29.5	21.5
Lorestan	30.1	16.2
Mazandaran	31.7	25.7

province (Isfahan)		Country(IRAN)		NCD Risk Factor Surveillance System/ STEPs National Non Communicable Diseases Surveillance Survey: NCDSS (STEPS 2016)
2016	2010	2016	2010	
25.4	15.2	27	19.1	prevalence of HTN(aged ≥ 18 years old)
46.0	37.8	48.1	28.0	(aged ≥ 25 years old) Hypercholesterolemia
11.69	8.3	9.5	7.5	Diabetes(aged ≥ 25 years old)
61.3	44.2	59.3	48.2	Obesity, Over weight (aged ≥ 18 years old)
57.43	38.4	56.4	40.12	low physical activity(aged ≥ 18 years old)
9.04	اندازه گیری نشده	9.16	اندازه گیری نشده	salt intake (per day) gram
14.35	12.3	14.15	10.9	ever tobacco smoke(aged ≥ 18 years old)



- ▶ **Evidence-based guidelines** identify several key **self-care behaviors** for the management of hypertension: a **diet** rich in fruits and vegetables, cessation of smoking, sufficient **physical activity**, antihypertensive **medication**, reduction in **weight**, saturated and total fat, and **sodium**, and moderate alcohol consumption .Randomized clinical trials have shown significant **reductions in BP when these self-care guidelines were followed**
- ▶ **Self-care behaviors** have been documented as one of the main determinants of **hypertension control**

High blood pressure: you can prevent it.



Reduce salt
to less than 5g daily



Eat fruits and vegetables
regularly



Avoid saturated fats
and trans fats



Avoid tobacco



Reduce alcohol



Be physically
active every day



