Prevalence, awareness, treatment and control of hypertension: Two methods for classification

Farid Najafi
MD, PhD
Epidemiologist
Kermanshah University of Medical Sciences

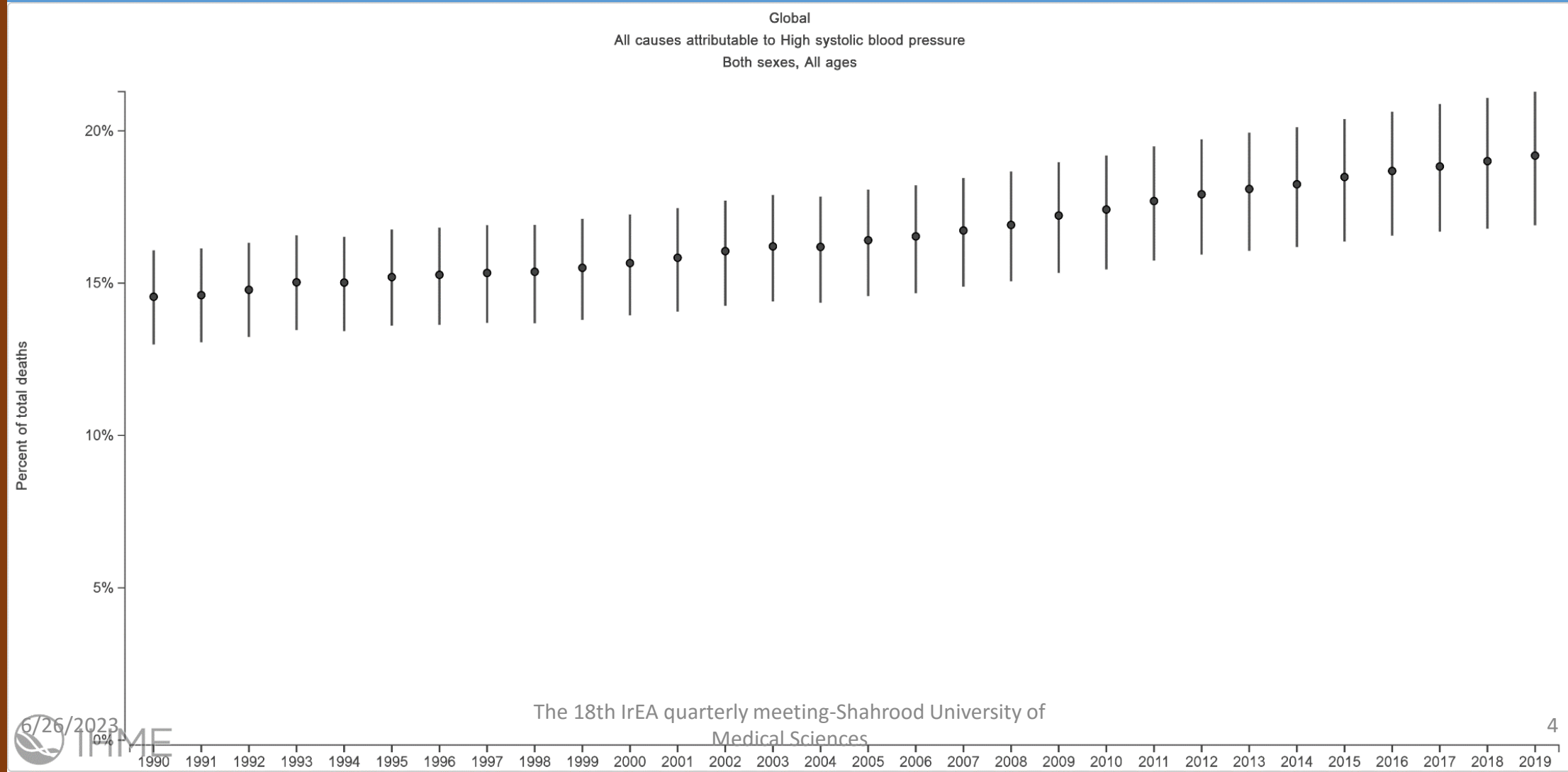
Outline of presentation

- Epidemiology of hypertension in the world and Iran
- Classification of hypertension based on the 2017 ACC/AHA and JNC7
- Prevalence, awareness, treatment and control of hypertension in PERSIAN Cohort study
- Public Health importance
- Knowledge translation of the findings

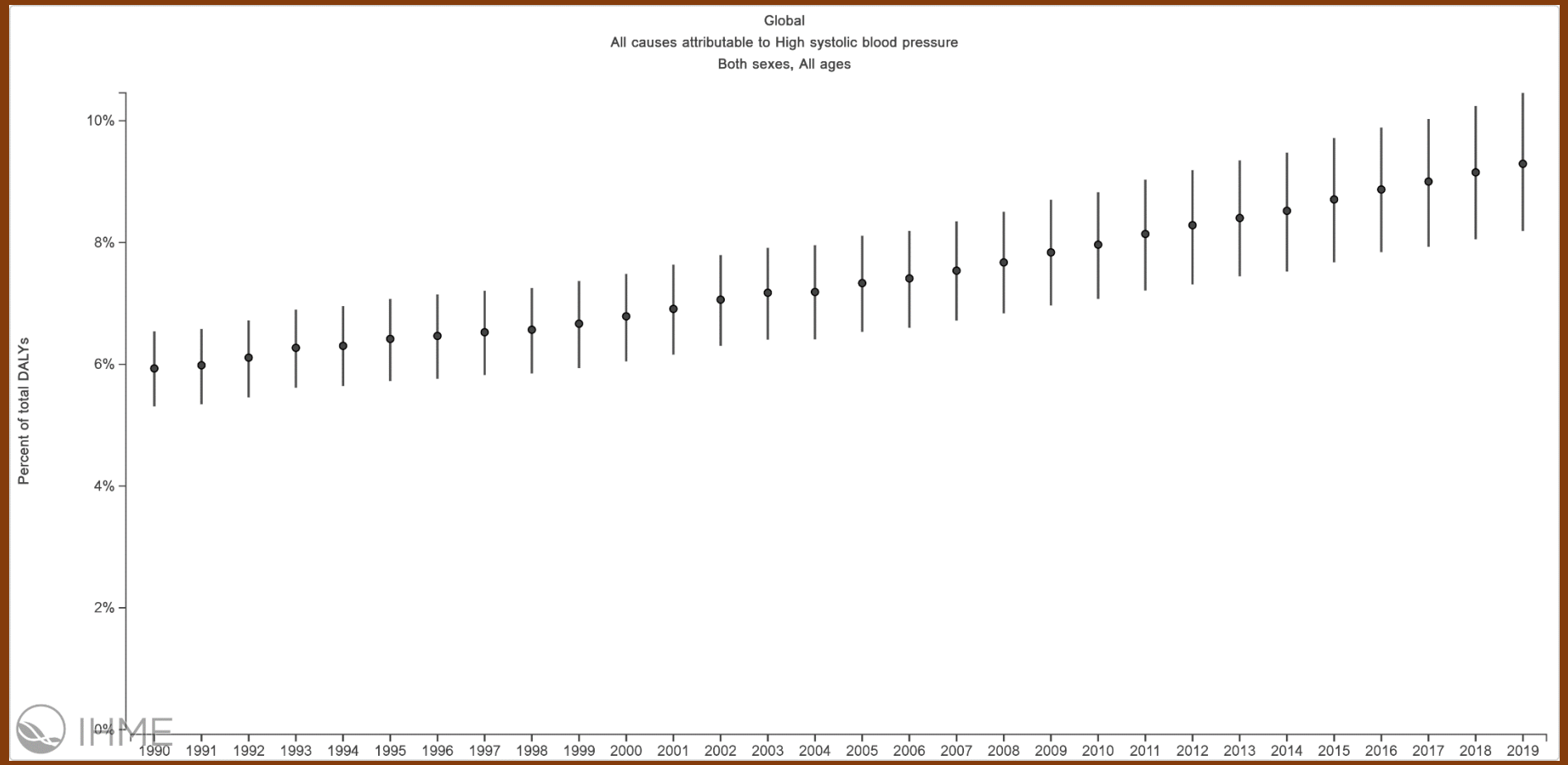
Global Epidemiology of hypertension

- A leading cause of CVD and premature death worldwide
- Mean blood pressure has remained stable but the prevalence of hypertension has increased since 2010, especially in low and middle-income countries
- DALY attributed to the hypertension is on rise in most countries
- Risk factors of hypertension in most likely on rise in most countries

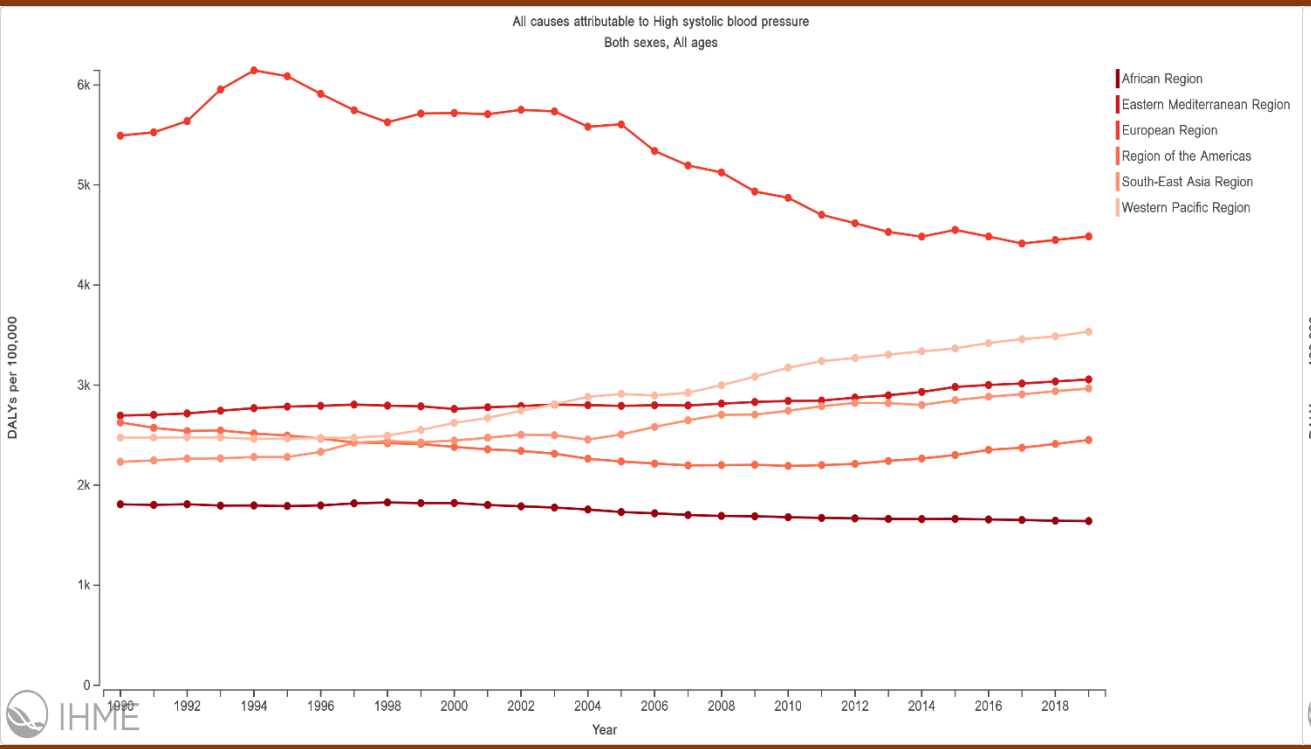
Contribution to total death

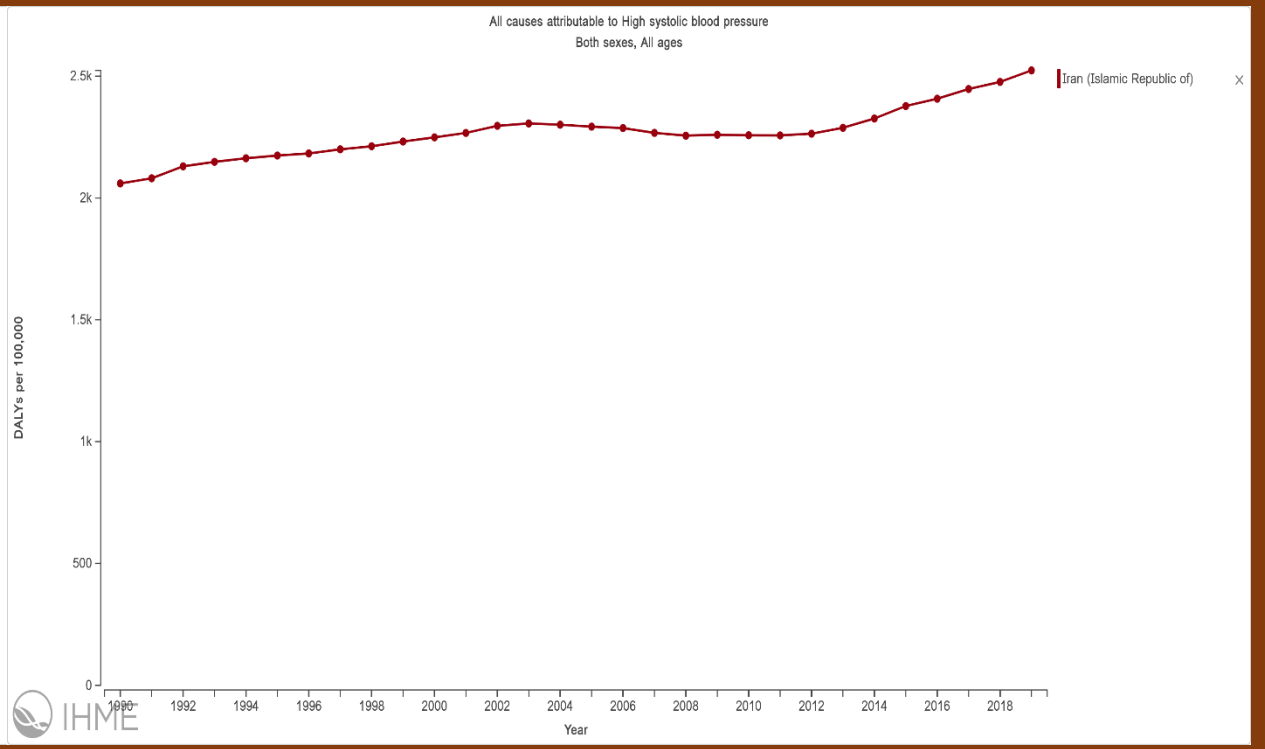


Contribution to total DALY (%)



Contribution to DALY rate (100,000)





Definition of hypertension JNC7 and AHA/ACC 2017

JNC 7

JNC 6 Category	SBP/DBP	JNC 7 Category
Optimal	< 120/80	Normal
Normal	120–129/80–84	Prehypertension
Borderline	130–139/85–89	
Hypertension	≥ 140/90	Hypertension
Stage 1	140–159/90–99	Stage 1
Stage 2	160–179/100–109	Stage 2
Stage 3	≥ 180/110	

AHA/ACC 2017

BP Category	SBP		DBP
Normal	<120 mm Hg	and	<80 mm Hg
Elevated	120–129 mm Hg	and	<80 mm Hg
Hypertension			
Stage 1	130–139 mm Hg	or	80–89 mm Hg
Stage 2	≥140 mm Hg	or	≥90 mm Hg

*Individuals with SBP and DBP in 2 categories should be designated to the higher BP category.

BP indicates blood pressure (based on an average of ≥2 careful readings obtained on ≥2 occasions, as detailed in Section 4); DBP, diastolic blood pressure; and SBP, systolic blood pressure.

Pro and cons for new classification

- Pro:
  1. Blood pressure at the range of stage 1 in AHA/ACC 2017 increase the risk of CVD by twofold
  2. Recent RCT have shown the benefit of controlling blood pressure to the level of less than 130 and 120 mmHg
  3. Early diagnosis and treatment of people with hypertension decrease the burden attributed to this condition
- Cons:
  1. Additional burden for treatment of hypertension by increase in prevalence of HTN in middle- and low-income countries

❖In Iran JNC7 is still widely used for diagnosis and treatment of hypertension especially in remote areas

scientific reports

OPEN

Prevalence, awareness, treatment, and control of hypertension based on ACC/AHA versus JNC7 guidelines in the PERSIAN cohort study

Sadaf Sepanlou[1,26], Farid Najafi[2,26], Hossein Poustchi[3], Mahboubeh Parsaeian[4], Ali Ahmadi[5], Mohammadhossein Somi[6], Farhad Moradpour[7], Reza Alizadeh-Navaei[8], Ali Gohari[9], Bijan Zamani[10], Ali Esmaeilinadimi[11], Abbas Rezaianzadeh[12], Fariborz Mansour-Ghanaei[13], Ehsan Bahramali[14], Alireza Ansari-Moghaddam[15], Behrooz Hamzeh[2], Elham Zanganeh Yousefabadi[16], Mohammad Javad Zare Sakhvidi[17], Iraj Mohebbi[18], Mohammad Reza Fattahi[19], Azim Nejatizadeh[20], Hossein Marioryad[21], Nazgol Motamed-Gorji[3], Farzin Roozafzai[3], Sareh Eghtesad[3], Zahra Mohammadi[3], Amaneh Shayanrad[3], Maryam Sharafkhah[3], Arash Etemadi[22], Farin Kamangar[23], Stephen P. Juraschek[24] & Reza Malekzadeh[25]✉

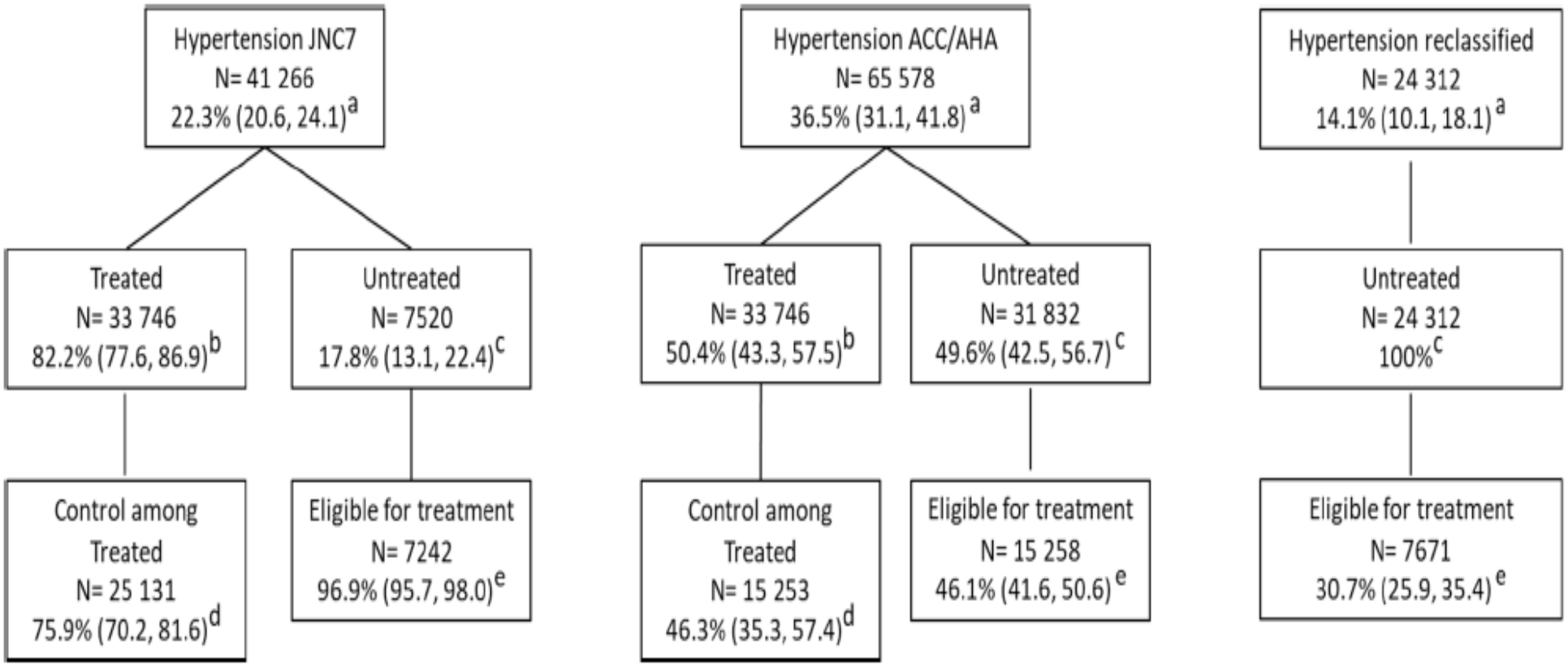
Methods

- 163,770 participant aged 35-70 years from 18 cohort centers of PERSIAN cohort
- 16 provinces
- A random sample from source population of all included cohort studies
- Blood pressure measurement: after 10 minutes of rest, twice from the right arm and twice from the left arm, with one minute interval between each of the two consecutive measurement
- The average of the second measurements from the right and left arms were calculated and considered as the level of blood pressure

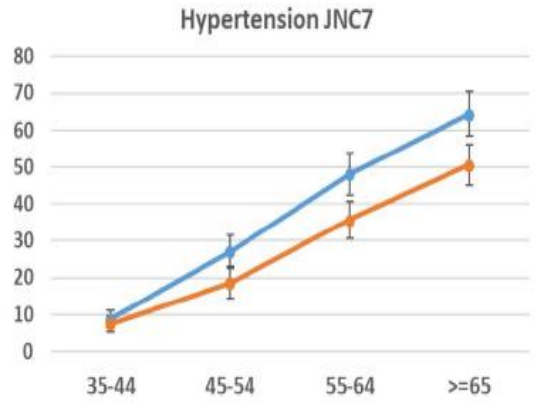
Methods (cont)

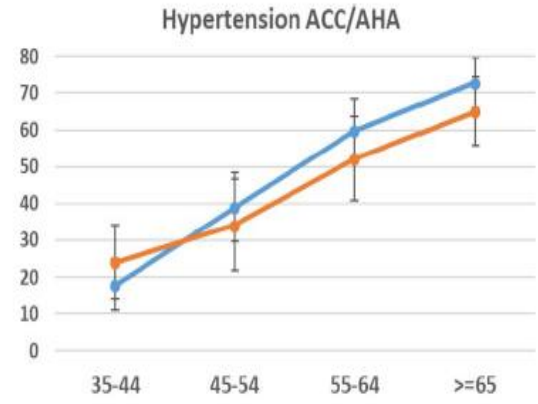
- Treatment: defined as self-reported intake or the antihypertensive medications that the participant brought with himself/herself to the study center
- Awareness: self-reported history of being diagnosed with hypertension by a physician or a health care professional

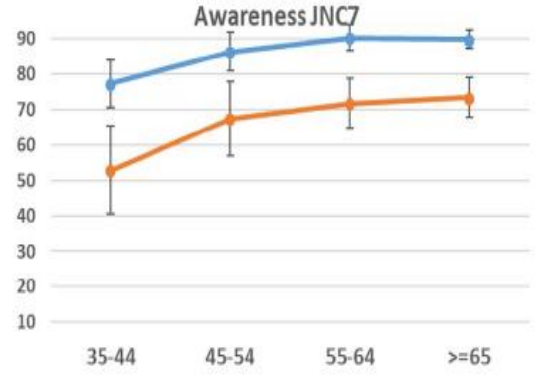
Prevalence, treatment and control of hypertension

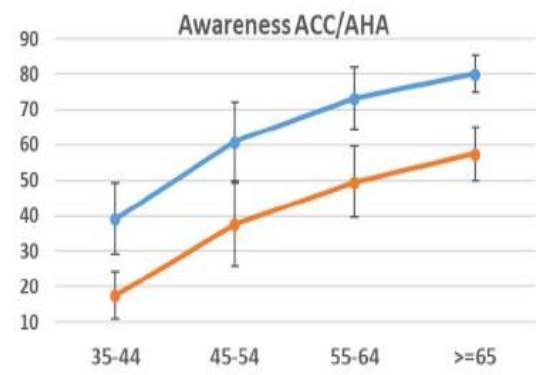


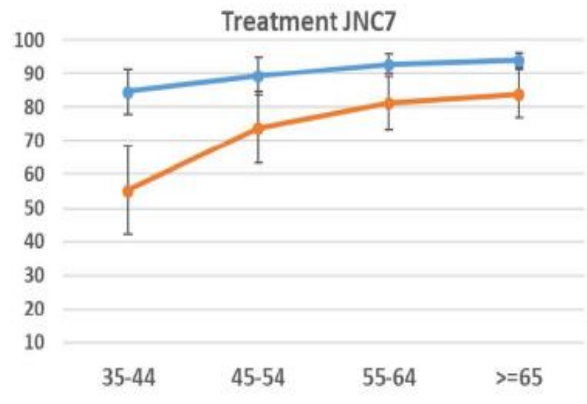
Prevalence, awareness, treatment and control of hypertension

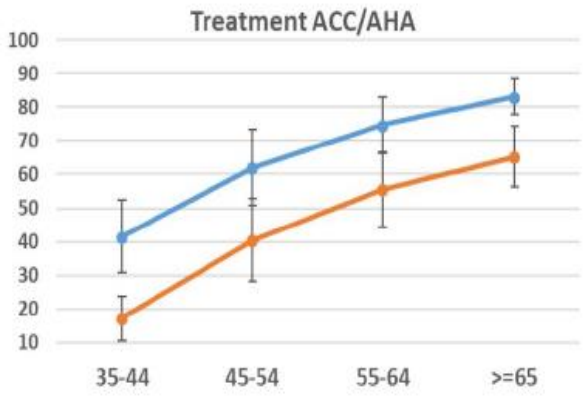


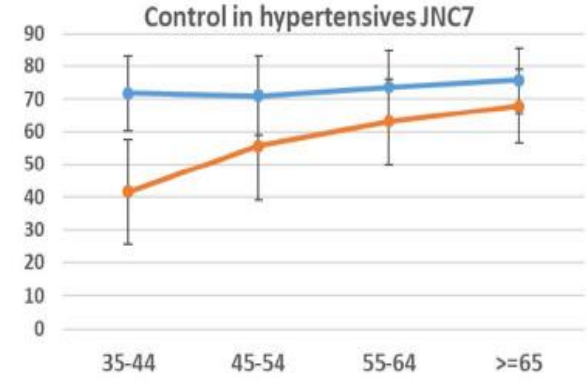


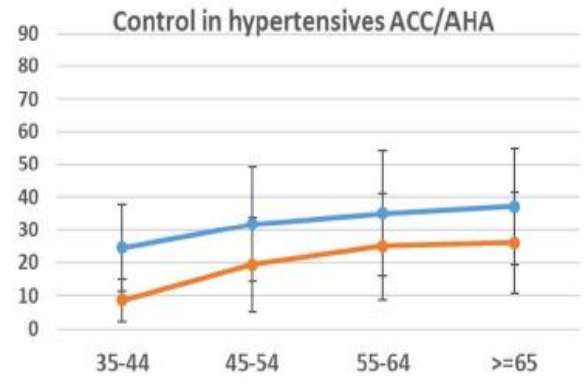




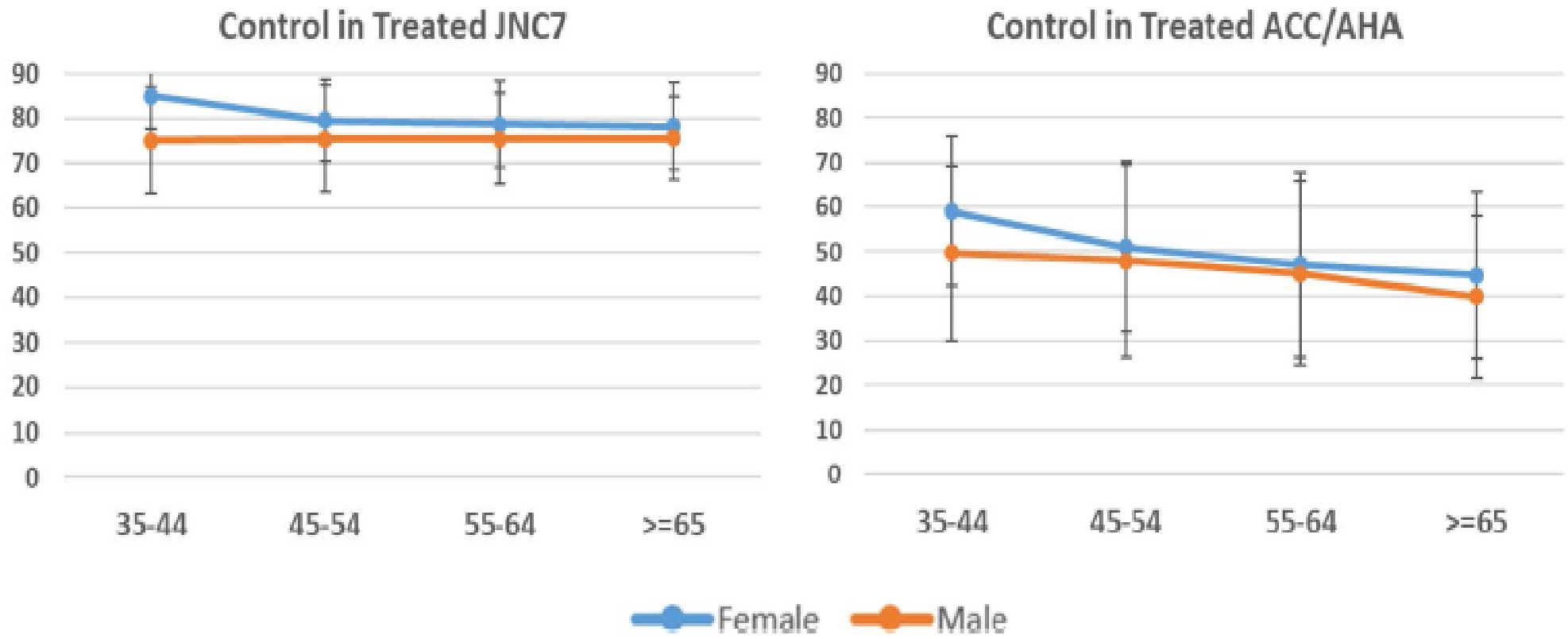








Control of hypertension among treated



Weighted prevalence of hypertension

	JNC7 (N = 41,266)	ACC/AHA (N = 65,578)	Reclassified participants (N = 24,312)	Relative Difference in prevalence (%)
Sex				
Male	18.9 (16.9, 20.9)	36.1 (29.6, 42.6)	17.2 (12.4, 22.1)	91
Female	25.9 (24.2, 27.7)	36.8 (32.3, 41.4)	10.9 (7.6, 14.1)	42.1
Age categories				
35–44	8.0 (6.7, 9.2)	21.9 (16.4, 27.5)	14.0 (9.6, 18.4)	173.8
45–54	22.9 (20.4, 25.4)	38.1 (31.8, 44.3)	15.2 (10.9, 19.4)	66.4
55–64	41.9 (39.2, 44.6)	55.9 (50.6, 61.1)	14.0 (10.4, 17.6)	33.4
≥ 65	57.9 (54.8, 60.9)	68.4 (64.2, 72.6)	10.5 (8.1, 13.0)	18.1
Residence				
Urban	22.5 (20.5, 24.5)	35.5 (29.0, 42.0)	13.0 (8.2, 17.8)	57.8
Rural	21.9 (18.2, 25.6)	39.8 (33.5, 46.1)	17.9 (15.1, 20.7)	81.7
Marital status				
Non-married	31.5 (28.6, 34.4)	43.2 (38.1, 48.2)	11.7 (8.2, 15.1)	37.1
Married	21.6 (19.8, 23.3)	35.9 (30.5, 41.4)	14.3 (10.3, 18.4)	66.2
Education				
Illiterate (no schooling)	36.0 (32.2, 39.8)	49.6 (44.2, 55.1)	13.6 (10.1, 17.2)	37.8
≤ 5 years (primary)	21.4 (18.8, 24.1)	35.8 (30.9, 40.7)	14.4 (10.6, 18.2)	67.3
6–8 years (middle)	15.3 (13.1, 17.4)	30.0 (23.6, 36.4)	14.7 (10.0, 19.5)	96.1
9–12 years (secondary)	15.7 (13.7, 17.7)	29.5 (23.7, 35.4)	13.8 (9.7, 18.0)	87.9
> 12 years (university)	15.5 (13.5, 17.5)	29.8 (23.0, 36.5)	14.3 (9.2, 19.3)	92.3

Weighted prevalence of hypertension

	JNC7 (N=41,266)	ACC/AHA (N=65,578)	Reclassified participants (N=24,312)	Relative Difference in prevalence (%)
Waist to hip ratio				
Normal	9.6 (8.3, 10.9)	22.0 (18.2, 25.9)	12.4 (9.3, 15.5)	129.2
High	25.6 (22.8, 28.3)	40.1 (33.0, 47.2)	14.5 (9.9, 19.2)	56.6
Diabetes				
No	18.0 (16.5, 19.4)	32.4 (27.0, 37.8)	14.4 (10.3, 18.6)	80
Yes	47.7 (45.2, 50.2)	59.8 (54.6, 65.0)	12.1 (9.0, 15.2)	25.4
Dyslipidemia				
No	17.5 (16.0, 19.0)	31.2 (26.0, 36.5)	13.7 (9.7, 17.7)	78.3
Yes	31.0 (28.8, 33.2)	45.8 (40.7, 51.0)	14.8 (10.9, 18.8)	47.7
CVD history				
No	18.7 (17.0, 20.5)	33.5 (27.8, 39.1)	14.7 (10.6, 18.9)	79.1
Yes	62.6 (59.5, 65.5)	69.8 (65.8, 73.9)	7.2 (5.2, 9.2)	11.5
CKD				
No	19.2 (17.2, 21.2)	34.1 (28.0, 40.1)	14.9 (10.6, 19.1)	11.5
Yes	37.1 (33.3, 40.8)	47.7 (42.5, 52.9)	10.6 (8.0, 13.2)	28.6
High ASCVD risk				
No	18.0 (16.6, 19.5)[a]	32.1 (26.9, 37.4)[b]	14.1 (9.9, 18.4)[c]	78.3
Yes	61.6 (59.1, 64.2)[a]	75.6 (71.6, 79.7)[b]	14.0 (11.9, 16.1)[c]	22.7

Conclusion

- Implementation of the 2017 ACC/AHA guideline will lead to shifting a group of mainly young male adults to the category of stage 1 of hypertension
- Cost-benefit of such strategy need to be investigated more carefully
- Clustering of metabolic risk factors show the necessities of implementing an integrated approach toward primordial prevention of such risk factors

Suggestion for knowledge translation

- Implementation of such classification need to be addressed in deputy of health of Ministry of Health and Medical Education with further investigation regarding the cost-benefit of such strategies
- Iranian Scientific Association of Epidemiology is ready to cooperate with policymakers to further study such suggestion.