Predictors of hypertension awareness and control among Arab and Jewish adults in Israel

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Background

- Hypertension is a leading risk factor for cardiovascular disease and a significant cause of morbidity and mortality.

- Inadequately controlled hypertension increases risks for first and recurrent events of acute coronary syndrome and stroke, as well as for heart failure and chronic kidney disease.

- Recent population-based data on hypertension awareness and control derived from BP measurements among adults in Israel is lacking.

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- The objective of our study is to identify factors associated with control and awareness of hypertension in the Israeli population.

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- Participants (1,100; age: 25-74 years) were selected at random from the general urban population of the Hadera district in Israel, stratified by ethnicity, gender and age.

- Socio-demographic, lifestyle, and health status data were collected via interviewer-administered questionnaires during 2002-2007.

- The analysis was conducted on a subsample (n=764) who also provided anthropometric and blood-pressure (BP) measurements.

Methods

- Three BP readings were taken after a minimum of a 5-minute rest with a standard mercury-gravity manometer and a cuff-size based on arm circumference; the 1st and 5th Korotkoff sounds were recorded for systolic and diastolic pressure, respectively.

- The second and third readings were averaged to obtain the BP values used in the analysis.

- Hypertension was defined as self-reported physician diagnosis of hypertension, or use of antihypertensive medication, or systolic BP (SBP) ≥140 mmHg, or diastolic BP (DBP) ≥90 mmHg.

Methods II

- Hypertension prevalence was calculated after standardization of the data to the age and ethnic distribution of the Israeli population in 2004.
- BP levels were also categorized according to JNC-7 stages:
  1. **Normal** (SBP<120 mmHg and DBP<80 mmHg)
  2. **Prehypertension** (SBP 120-139 mmHg or DBP 80-89 mmHg)
  3. **Hypertension** – Stages 1 & 2 combined (SBP≥140 mmHg or DBP≥90 mmHg).

Hypertension Awareness and Control

- Hypertensive participants were classified as "aware" if they responded positively to the question, "Have you ever been told by a doctor or other health professional that you had hypertension (high blood pressure)?"

- Hypertensive participants were further classified as:

  1. **"Aware and controlled"**: self-reported hypertension, and measured SBP<140 mmHg and DBP<90 mmHg
  2. **"Aware and uncontrolled"**: self-reported hypertension, and measured SBP≥140 mmHg or DBP≥90 mmHg
  3. **"Unaware and uncontrolled"**: no self-reported hypertension and measured SBP≥140 mmHg or DBP≥90 mmHg

- Predictors of BP stage (across JNC-7 categories) and hypertension awareness and control were evaluated in multivariate regression models controlling for year of interview.

Hypertension prevalence
**(standardized to the 2004 Israeli population)**
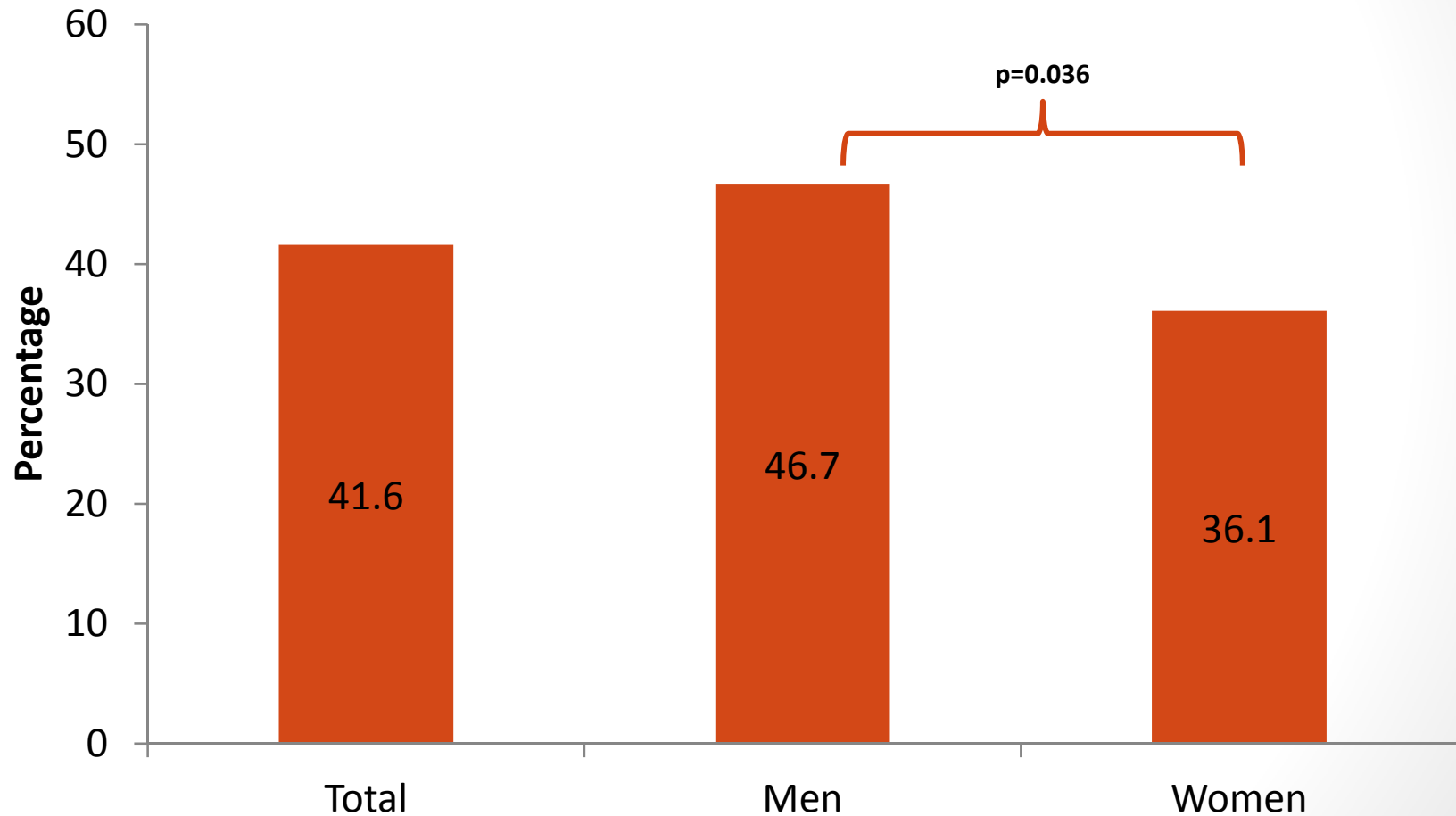
Selected participant characteristics by JNC-7 category

Characteristic	Total (n=763)	Normal (n=225)	Pre-HTN (n=305)	HTN (n=233)	P
Males, %	50.7	43.6	50.2	58.3	0.006
Arabs, %	48.9	45.8	47.5	53.7	0.201
Age, y; median	50	41	52	59	<0.001
Married, %	83.5	86.2	83.9	80.3	0.014
Education, y; median	12	12	12	10	0.001

Age-adjusted percentage of men and women in the highest JNC-7 category (Stage I or II hypertension) by marital status

Stage I or II hypertension (%)

	Women	Men
Single/divorced	25.8	33.0
Married	22.4	35.7
Widowed	55.3	39.6

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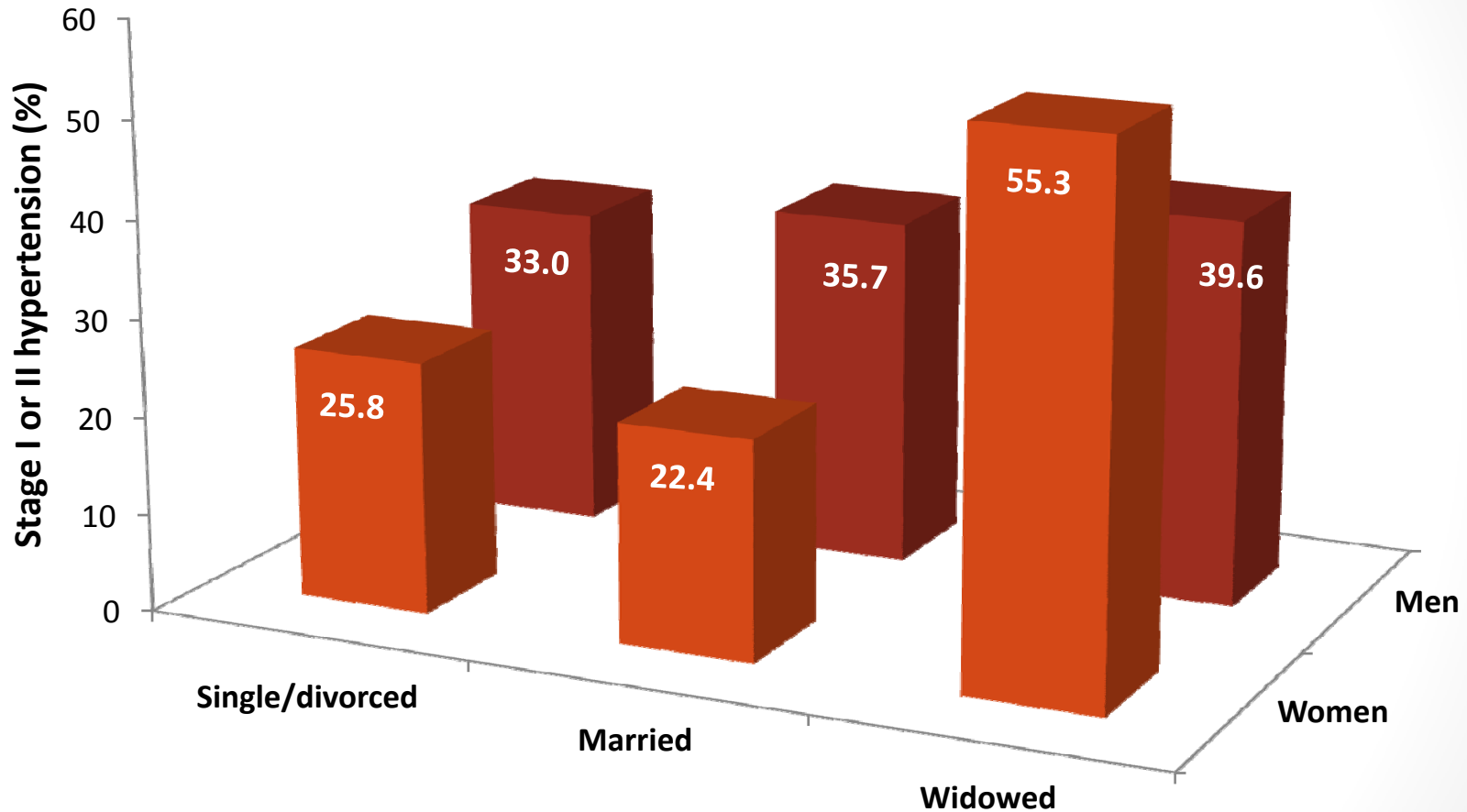
Multivariate ordinal logistic model for factors associated with the odds of being in a higher JNC-7 category

Characteristic	Adjusted OR*	95% CI
Gender: male vs. female[†]	2.71	1.88-3.92
Ethnicity: Arab vs. Jew	1.25	0.88-1.78
Age (10y increment)	1.67	1.44-1.95
Marital status[‡]		
Single or divorced vs. married	2.05	1.17-3.60
Widowed vs. married	2.52	1.26-5.06
Smoking status: Current vs. never	0.61	0.42-0.89
Knowledge of HTN as HD risk factor (yes vs. no)	2.25	1.31-3.85
BMI (per 1 unit increment)	1.05	1.02-1.08

* Controlling for anti-hypertensive medications, years of education, and time period of interview
[†]Main effect of variable in the gender*marital status interaction; OR represents the comparison between married men and women
[‡]Main effect of variable in the gender*marital status interaction; OR represents the comparison of single/divorced and widowed women to married women.

Prevalence and selected characteristics of hypertensive participants by hypertension awareness and control levels

Of those with hypertension (n=335), 70% were aware, 44% of whom exhibited adequate BP control.

Characteristic	Aware & controlled (n=102)	Aware & Uncontrolled (n=132)	Unaware & Uncontrolled (n=101)	P
Males, %	48.0	53.8	64.4	0.059
Arabs, %	42.2	47.0	62.4	0.010
Age, y; median	62	62	52	<0.001
Married, %	89.2	78.8	82.2	0.014

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Multinomial analysis :
Factors associated with being "Aware & Uncontrolled" or "Unaware & Uncontrolled.
Reference category: "Aware & controlled"

Characteristic	Aware & Uncontrolled OR (95% CI)	Unaware & Uncontrolled OR (95% CI)
Gender: male vs. female[†]	1.76 (0.953-3.26)	1.55 (0.75-3.18)
Ethnicity: Arab vs. Jew	1.29 (0.56-2.96)	3.33 (1.35-8.22)
Age (10y increment)	1.78 (1.20-2.66)	1.04 (0.70-1.55)
Marital status		
Single or divorced vs. married	2.75 (0.75-10.03)	4.71 (1.27-17.48)
Widowed vs. married	3.14 (1.10-8.97)	3.12 (0.81-12.01)
Visits to family physician per year: <3 vs. 3+	0.61 (0.25-1.50)	5.52 (2.51-12.14)

*Controlling for years of education, time period of interview, knowledge of HTN as HD risk factor, family history of hypertension, and renal failure

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- Hypertension prevalence is relatively high.
- Gender differences in BP stage depend upon marital status: gender advantage of women attenuated among widowed and single/divorced women.
- Social factors (e.g., marital status, family history of hypertension) and primary healthcare service utilization predict hypertension awareness and control.
- Awareness needs improvement among Arabs.

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- The overall response rate to interview was 84%.
- Of 1,100 participants, 69% had also blood pressure and anthropometric measurements.
- The age- and gender-adjusted prevalence of hypertension among participants and non-respondents did not significantly differ (p=0.44).
- The rate of agreement between self-reported hypertension and diagnosis of hypertension in the primary-care medical records was moderately high (Kappa=0.71).