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Hypertension prevalence in a representative sample of Greek adults: The Hellenic National Nutrition and Health Survey (HNNHS)

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Hypertension is a major risk of cardiovascular diseases. In Greece, large cross-sectional studies have reported a hypertension prevalence between 13-27%^{1,2}, with approximately 40% of the population being aware of their status and 33%-34% having their hypertension controlled^{3,4}. Result generalizability to the Greek adult population, however, can be questioned, despite the large sample sizes since samples were collected from hospitals and clinics and not from the general population³, or from rural and urban areas of the Attica prefecture (Greece)³. In summary, despite the detrimental aspects of hypertension, limited data from a representative sample have been reported in Greece. Therefore, the aim of this study was to assess prevalence of hypertension in a national representative sample of Greek adults.

Data from the Hellenic National Nutrition and Health Survey (HNNHS), was used to examine prevalence, awareness, treatment and control of hypertension. The study was carried out from 01.09.2013 to 31.05.2015, and surveyed non-institutionalized civilians of all ages, living in Greece. Stratification was performed according to (a) geographical density criteria by Greek region (7 regions), as provided by the Hellenic Statistical Authority, (b) age group and (c) gender distribution.

Individuals were categorized as normotensive or hypertensive by experienced clinicians, based on International Classification of Diseases (ICD)-10 diagnosis codes, or if they had been diagnosed as being hypertensive at least once in the past by a clinician, and/or if they reported being on any antihypertensive medication.

A total of 3775 adults (40.8% males), and non-pregnant or lactating women were used for the study. Details on the study design can be found in detail elsewhere⁵.

Individual consent was obtained as well as approval by the Ethics Committee of the Department of Food Science and Human Nutrition of the Agricultural University of Athens and by the Hellenic Data Protection Authority (HDPa).

Hypertension adjusted prevalence and percent of treated population by area and sex are shown in Table 1. A total estimated prevalence standardized for population distribution by sex and area, of 16.6% was obtained with no sex differences ($p=0.521$). Highest hypertension prevalence and population on treatment, were found in adults residing in the Greek mainland (25.1% and 93.6%, respectively), and the lowest in the 2 regions with the biggest cities (Athens and Thessaloniki) of Greece (13.4% and 87.2%, respectively), with significant differences in hypertension prevalence found between all 3 areas (P for all comparisons <0.05). The higher prevalence can be explained, at least partly, by the lack of adequate health care

facilities in these areas. Hypertension prevalence significantly differed between age groups, within each sex, with 2.7%, 14.4% and 48.7% males aged 20-39, 40-59 and 60+, respectively, being found with hypertension, in comparison to 1.0%, 13.0% and 54.8% of females (p for all <0.05 ; data not shown). Total awareness was 58.9%, with significantly more females having knowledge of their hypertensive state (66,7%) compared to males (50.5%).

This study adds to the Global European databank and underlines the problem of hypertension in Greece. In particular, this study showed that almost 2 in 5 individuals were unaware of their hypertensive status, and although most individuals diagnosed were on treatment, only 70% of them were controlled.

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Table 1: Prevalence of adults diagnosed with hypertension and percent of those treated, based on Medical History, by area and sex.

	Total		Males		Females		Between sex P value*
Hypertension							
	N=3761		N=1537		N=2224		
	%	SE	%	SE	%	SE	
Total population	16.6	0.01	16.2	0.01	16.9	0.01	0.521
Attiki & Region of Thessaloniki (N=2583)^{a,b}	13.4	0.01	12.7	0.01	13.9	0.01	0.366
Islands (N=360)^{a,c}	18.9	0.02	18.8	0.03	19.1	0.03	0.942
Remaining Mainland (N=818)^{b,c}	25.1	0.02	24.5	0.02	25.8	0.02	0.665
% Hypertensives treated							
Total treated population	89.6	0.01	87.8	0.02	91.1	0.02	0.206
Attiki & Region of Thessaloniki (N=2583)^b	87.2	0.02	86.3	0.03	87.9	0.02	0.669
Islands (N=360)	90.5	0.04	86.2	0.06	94.7	0.04	0.253
Remaining Mainland (N=818)^b	93.6	0.02	90.6	0.03	96.5	0.02	0.103

Results weighted for area of residence, age and gender

^{a,b,c}: denotes statistical differences in hypertension prevalence by area. Same superscript indicates significant difference.

*Statistical difference between males and females in total and for same area.

Significance at $\alpha=0,05$ level, two tailed test