



Nutrition and Health of the Population in Greece



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HYDRIA Project: Findings, Conclusions and Proposals for Policy Actions



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Nutrition and Health of the Population in Greece

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**Project Title: “HYDRIA. Programme and targeted action on the diet and health of the Greek population: development and implementation of methodology and documentation”**

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HYDRIA Project: Findings, Conclusions and Proposals for Policy Actions

This publication has been produced to the requirements of the project “HYDRIA. Programme and targeted action on the diet and health of the Greek population: development and implementation of methodology and documentation” and represents the views of the authors. These views have not been adopted nor in any way approved by the Special Services Department of the Hellenic Ministry of Health and Social Solidarity or the European Commission and should not be regarded as the position of the Ministry or Commission. The Ministry does not guarantee the accuracy of the information contained in this publication, nor does it accept any responsibility for the use of any of this information.

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## PREFACE

The Hellenic Health Foundation (HHF) presents the first results of the HYDRIA survey, based on data collected in a sample of more than 4,000 adults covering all regions of Greece.

Results highlight the demographic differences and socio-economic disparities in factors associated with the occurrence of disease, such as smoking habits, poor dietary choices and reduced physical activity. Similarly, findings provide an insight on the relationship of personal characteristics and lifestyle choices with the prevalence of chronic diseases (e.g. diabetes mellitus, cardiovascular disease, obesity and hypertension) in a nationally representative sample of the population in Greece.

With this report the team of the HYDRIA survey aims to disseminate results to society, stakeholders, opinion- and decision-makers alike for the purpose of using those valuable data to inform and document contemporary problems in public health as well as factors shaping them.

This depiction, with the wealth of information included, could be the cornerstone for formulation of national policy on public health issues aimed at preventing disease and promoting health.

This study and the unique (for Greece) type of data collected could have not been made possible without the hard work of so many people who constituted the HYDRIA team and the more than 4,000 survey participants.

This report was prepared in a collaborative way by: Eleni-Maria Papatesta, Eleni Klinaki, Georgia Martimianaki, Philippos Orfanos, George Venetis, Elisavet Valanou, Pericles Karathanasis, Ioannis Nicolaidis, and Androniki Naska.

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Professor Antonia Trichopoulou,

President of the Hellenic Health Foundation

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## CONTENTS

- 7 INTRODUCTION
- 9 HYDRIA. PROGRAMME AND TARGETED ACTION ON THE DIET AND HEALTH OF THE GREEK POPULATION: DEVELOPMENT AND IMPLEMENTATION OF METHODOLOGY AND DOCUMENTATION
- 13 RESULTS

### SECTION A

- 15 DEMOGRAPHIC AND SOCIO-ECONOMIC CHARACTERISTICS OF THE SAMPLE OF PARTICIPANTS

### SECTION B

- 21 HEALTH INDICATORS OF THE POPULATION IN GREECE

### SECTION C

- 37 SMOKING HABITS, SOMATOMETRIC CHARACTERISTICS, DIETARY INTAKE AND PHYSICAL ACTIVITY OF THE POPULATION IN GREECE

### SECTION D

- 51 BLOOD PRESSURE, HEART RATES AND LEVELS OF BIOCHEMICAL MARKERS REPRESENTATIVE FOR THE POPULATION OF GREECE

### SECTION E

- 59 MEDICATION INTAKE
- 62 CONCLUSIONS AND PROPOSALS FOR POLICY ACTIONS

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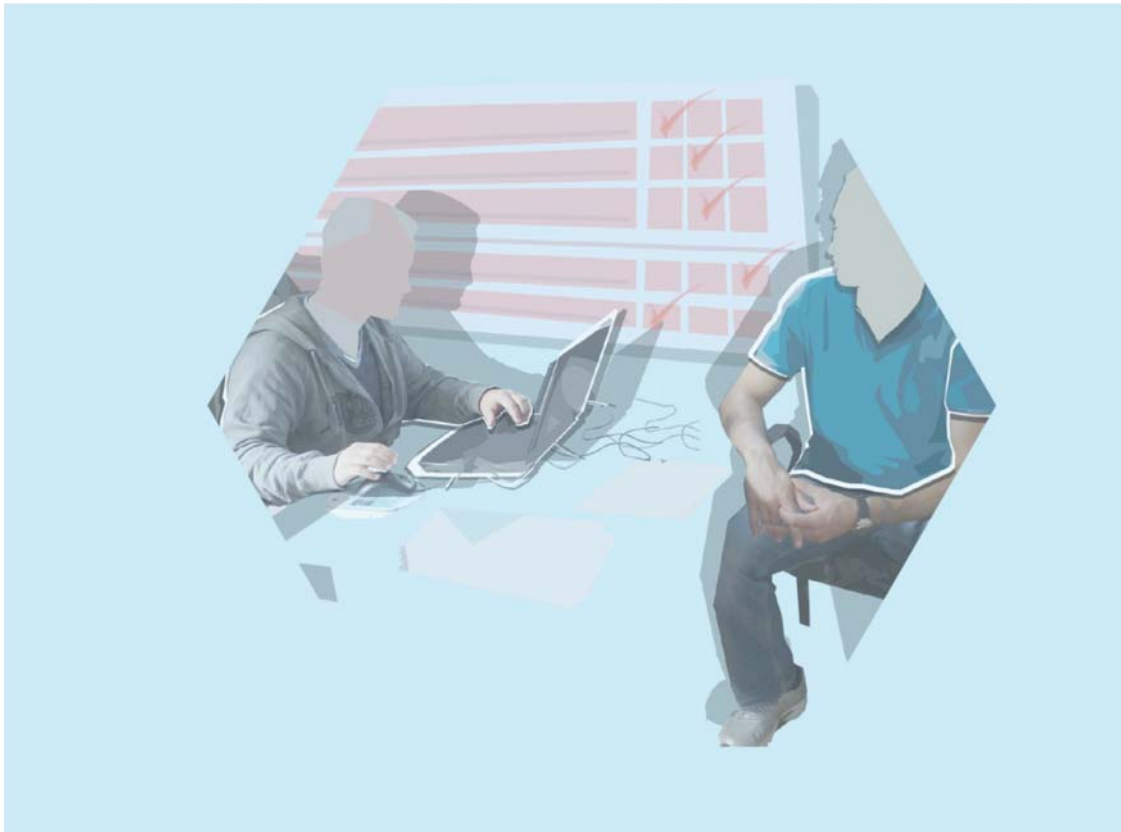
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## INTRODUCTION

In Greece several studies have focused on health related indicators and disease risk factors. These data, however, do not adequately reflect the state of health of the overall adult population. Firstly, they do not generally report on a representative sample of the population and secondly they have focused on a limited number of health indicators. The Commission of the European Communities (EC) notes that the European Union's population is aging because of the falling birth rate and the increased life expectancy. The EC further comments that by 2020, there will be 40% more people aged 75 years and over than in 1990. This is likely to increase demand for health services and to require changes in their organisation and structure. As the percentage of people aged 80-90 years will increase, more people will need long-term health care services and specialised social services. Meanwhile, the economic crisis and the impoverishment of the population in Greece (increase in the number of households below the poverty line) is directly linked to increased health risks. These degrade the quality, productivity and employability of the workforce as much as social cohesion. In addition, these trends are threatening to lead to a significant increase in the cost for protection and preservation of public health<sup>1</sup>.

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<sup>1</sup>. 2008-2013 EU funded actions to support the EU Public Health Priorities Nutrition and Physical Activity Actions addressing Obesity ISBN 978-92-9200-037-0. European Union, 2014.  
[http://ec.europa.eu/health/nutrition\\_physical\\_activity/docs/nutrition\\_fundedactions\\_2014\\_en.pdf](http://ec.europa.eu/health/nutrition_physical_activity/docs/nutrition_fundedactions_2014_en.pdf)

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Therefore, a thorough and detailed knowledge of health related indicators along with morbidity and mortality rates of a population is a prerequisite for formulating and implementing effective policies. Health promotion and disease prevention measures that take into account population needs will be able to reduce already documented and detected risk factors and conditions. It should be noted that evaluation of the demand for health services is relatively easy, as it can be done by collecting data at service points. In contrast, assessment of the determined and non-determined needs of the population is only possible with the implementation of targeted research, based on international standards, across a representative sample of the population. This requires specific methodology protocols which provide for, inter alia, site visits to examine participants, medical history collection and especially designed questionnaires for recording personal characteristics and attitudes towards health-related issues. Field investigations are laborious, time consuming and expensive. In some countries, a nationally representative sample of about 5,000 individuals is taken every 5 to 10 years. The results are fed into national health indices and are an absolutely necessary, effective administrative tool to gauge the health of the population and trends over time in order to ascertain the potential demand for health services and to discover possible social and regional disparities. The hitherto lack of research of this type in Greece has made it more difficult to make informed policy decisions, while at the same time the country was not in a position to provide data to reports required to be submitted to international organisations. Additionally, with the absence of such baseline information, it has not been easy to evaluate any true impact of health policy decisions in the country overall<sup>2</sup> or to specific population groups.

The HYDRIA survey, which was designed and developed according to the recommendations of European reference centers for conducting health and nutrition surveillance studies and hence, fills this gap. The survey results will feed into the Health Charter of the Ministry of Health and from the analysis of the data, conclusions, useful observations and recommendations for health policy will arise. At the same time, data from the HYDRIA survey will be used in the future to evaluate the effectiveness of intervention in primary and secondary health care.

This report presents the first findings of the HYDRIA survey which includes risk factors and relevant data to allow prioritization of health needs and formulation of policy proposals for addressing both short and long-term key risk factors of disease.

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<sup>2</sup>. Kervasdoue J. (2008). OECD Public Management reviews: Strengthening Public Administration Reform in Greece, working paper V5, HEALTH CARE SYSTEM IN GREECE.  
<https://www.scribd.com/doc/31289921/HEALTH-CARE-SYSTEM-IN-GREECE>





## **HYDRIA. Programme and targeted action on the diet and health of the Greek population: development and implementation of methodology and documentation<sup>3</sup>**

The HYDRIA survey has been the first national project on the health and nutrition of the population in Greece. Its methodology has adapted international standards for throughout the research process in documenting the health status of the country's population and its associated risk factors, with the ultimate purpose of improving public health policies. To achieve this goal data were recorded in 2013-2014 of individual characteristics, lifestyle choices, medical history, dietary data, somatometric characteristics, and biochemical indicators in a representative sample of the population consisting of adult men and women permanent residents in the country. The HYDRIA survey has been coordinated by the Hellenic Health Foundation (HHF) in collaboration with the Hellenic Center for Disease Control & Prevention (HCDCP) of the Hellenic Ministry of Health.

The HYDRIA survey is based on the standards of the European Health Examination Survey (EHES), ([www.ehes.info](http://www.ehes.info)). Prior to its broad application it was evaluated by a preliminary study (EHES-Pilot Joint Action, 2009-2011) which was coordinated by the National Institute of Health and Welfare in Finland and funded by the European Commission Directorate General for Health and Food Safety. A 3-day practical training seminar was held to issue instructions and train the on-site data collection teams (fieldwork teams) and the 55 health professionals from the partner primary health centres in all regions of the country and to ensure the standardisation of procedures.

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<sup>3</sup>. Code MIS 346816, Thematic Priority " Consolidation of the reform in the Mental Health Sector. Development of Primary Health Care and promoting the Public Health of the population", Operational Programme "Human Resources Development", NSRF 2007-2013.

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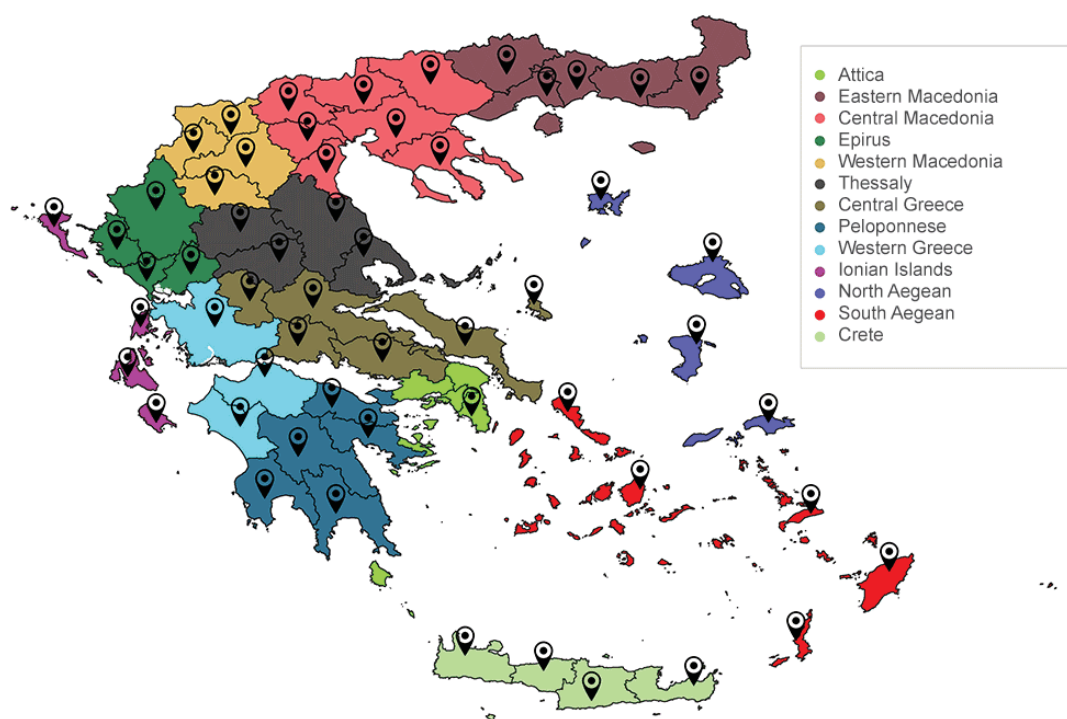
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The field data collection was conducted during the period of June 2013 to December 2014. The total number of participants in the study was 4011 men and women aged 18 years and over who are permanent residents in Greece. The survey sample is taken from the 51 regional areas (prefectures) of the 13 regions of the country (Figure 1) and was based on the last general census on population and housing (2011). The method applied for selection of the sample was as two-staged stratified random sampling, with the primary sampling unit being the municipal/local community (1st stage) and the final unit being the individual (2nd stage). The criteria of stratification were the geographic division of the country and the degree of urbanisation of the permanent residential area; selection was made by gender and age group. Specifically, on-site data collection teams, under the guidance of the operations manager and research management team, visited 205 randomly selected municipalities/local communities in the country to conduct meetings with participants in primary health care facilities (e.g. health centers) and local facilities (e.g. municipal clinics).

**Figure 1. Regions and Prefectures of Greece which held data collection under the HYDRIA survey.**



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The data collection sessions were held to locations close to participant's residences and set after personal telephone communications and on days and at times that suited the participants. Participants were informed of the project, and after giving an informed consent, the data collection process began. The data collection included an examination of participants and information gathering as per the following:

- pulse measurement, blood pressure and somatometric characteristics (height, weight, waist and hip circumference),
- filling-in questionnaires through personal interview (interviewer administered questionnaires) in order to obtain health information, diet (24-hour dietary recalls and non-quantitative food frequency questionnaire), and the participant's life-style (e.g. physical activity, smoking habits) and
- drawing of a blood sample. With the consent of participants, part of the blood sample was stored in a deep freeze (-80°C) for conducting future evaluations.

The survey data were entered and stored electronically in the HHF central server anonymously and encrypted to maintain the confidentiality of participants. To ensure the quality of the information collected, automatic logic checks were applied in real time by the specific software developed to be used for data recording. Note that the collected data are protected under the applicable national law and by the approval received by HHF from the Hellenic Data Protection Authority (HDP, [www.dpa.gr](http://www.dpa.gr)) needed for establishing and operating a file registry of sensitive personal data according to the law N.2472/1997.

With support from the European Food Safety Agency (EFSA), the methods applied in the HYDRIA survey have been adapted to be used for the collection of nutrition-related data in children (Ref. Contract: OC/EFSA/DATA/2014/02-LOT1/CT04) and adolescents (Ref. Contract: OC/EFSA/DCM/2013/02-LOT2-CT03) who are permanent residents in Greece. With the completion of these two additional studies, the dietary intake of children, adolescents and adults up to 74 years will be integrated in EFSA's central database to be used in the Agency's analyses to assess intakes and nutritional risks in the Member States.

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## RESULTS

The following sections present the results of the national survey on the health and nutrition of the population in Greece - HYDRIA survey. More specifically, the population's health status through the presentation of health indicators by gender, age group and educational level of the participants is portrayed. Please note, that the choice of health indicators (prevalence of chronic diseases and frequency of personal characteristics and risk factors) and the method of presentation are based on the recommendations of the European Commission's Directorate General for Health and Food Safety for the presentation of health indicators (European Core Health Indicators, ECHI), in order for the results to be directly comparable with those of other European countries.

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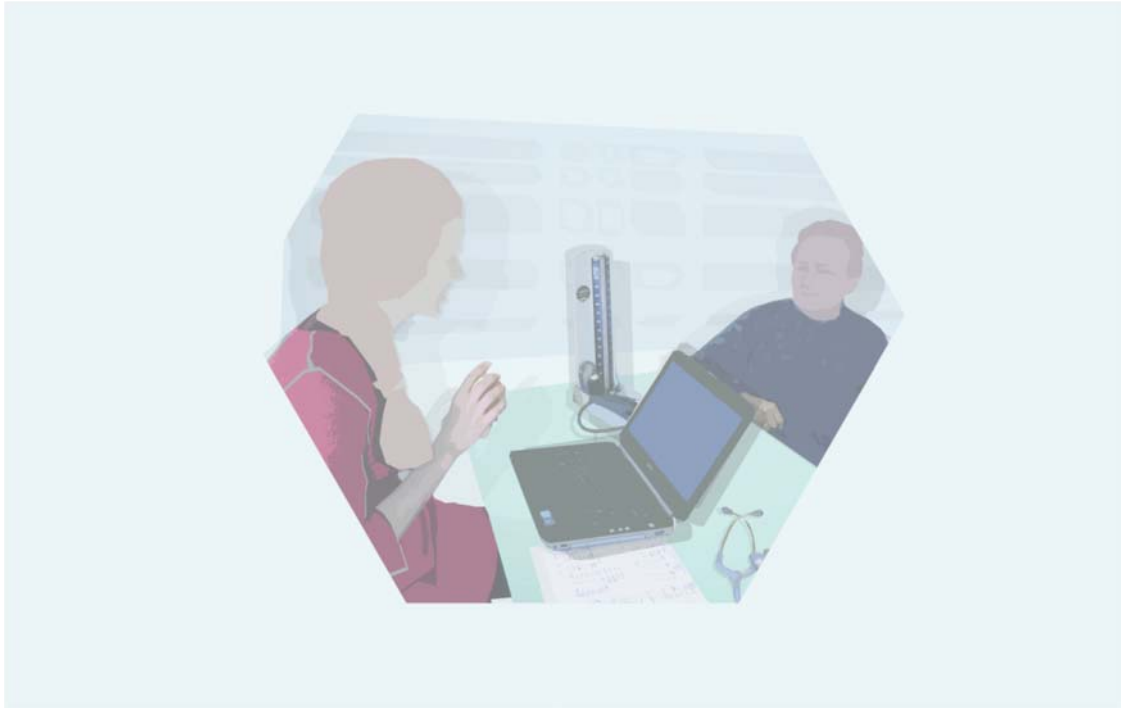
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## SECTION A



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## Demographic and socio-economic characteristics of the sample of participants

An invitation to participate in the HYDRIA survey was issued to individuals aged 18 years and above permanent residents in Greece according to the latest general census of the population (2011). During enrolment the survey's participants presented an identity card or other official document as personal identification and proof of age.

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**Table A.1: Distribution (%) of the 4011 participants in the HYDRIA survey relative to the population of Greece, by gender and age group.**

Age (years)	Men		Women		Total	
	HYDRIA (46.7)	Greece (48.2)	HYDRIA (53.3)	Greece (51.8)	HYDRIA	Greece
18-24	7.9	8.7	9.2	8.2	8.6	8.5
25-34	16.4	16.7	15.5	15.0	15.9	15.8
35-44	19.0	19.1	19.3	17.6	19.2	18.4
45-54	18.2	17.6	19.1	17.3	18.7	17.4
55-64	16.8	14.8	17.0	15.0	16.9	14.9
65-74	13.2	11.9	12.2	12.6	12.7	12.2
≥75	8.5	11.3	7.7	14.3	8.1	12.8

Source: Hellenic Statistical Authority (ELSTAT)

The HYDRIA survey sample did not deviate substantially from the distribution of the population in Greece in terms of gender and age group of the individuals. The largest deviation of the sample distribution related to that of the country's population was observed in persons aged 75 years and older (about 5%). The divergence of the two distributions is greater in women in this age group, possibly reflecting the difficulty older people have in participating in this type of research.

The level of education is considered as a reliable measurable indicator of the socio-economic status of the population in Greece. In the HYDRIA survey, the level of education was based on a statement regarding the highest level course which the participants had successfully completed up until the time of the interview (educational attainment). Completed study was considered to be the successful acquisition of a certificate or diploma and the description of the courses was based on the current Greek education system and is consistent with the classification in ISCED (International Standard Classification of Education). Three categories of education were created for the presentation of the survey's results: low, intermediate, high. The 'low' education category includes individuals who had up to nine years of education/training (including those who did not go to school). The 'intermediate' category includes participants who followed school (including any type of vocational training) for more than nine and up to twelve years. The 'high' educational level indicates individuals who had completed higher education, including postgraduate and/or doctoral degree holders.





**Table A.2: Distribution (%) of the 4011 participants in the HYDRIA survey relative to the population of Greece, by gender and educational level.**

Educational Level	Men		Women		Total	
	HYDRIA	Greece	HYDRIA	Greece	HYDRIA	Greece
Low	25.4	34.6	30.2	43.7	28.0	39.3
Intermediate	41.0	41.8	42.0	36.3	41.5	38.9
High	33.6	23.6	27.8	20.1	30.5	21.8

Source: Hellenic Statistical Authority (ELSTAT)

In comparison to the population of Greece, the HYDRIA sample includes fewer people in the low educational level and more in the high level. However, taking into consideration that older people usually have lower levels of education, the distribution of the sample by educational level may provide further evidence of the difficulty older people have in participating in this type of research.

The participants' employment was recorded by the completion of a series of questions, through which participants described their work. In the categories in Table A.3, the 'employed' group also included any unpaid helpers in family businesses, paid apprentices, investors and persons temporarily absent from work due to sick leave, holiday leave, maternity or parental leave. In the 'student' category students, postgraduates and interns working without pay for experience were also included.



**Table A.3: Distribution (%) of the 4011 participants in the HYDRIA survey relative to the population of Greece, by gender and employment category.**

Employment category	Men		Women		Total	
	HYDRIA	Greece	HYDRIA	Greece	HYDRIA	Greece
Employed	50.5	51.8	33.4	31.8	41.4	41.4
Unemployed	13.4	14.5	16.7	14.6	15.1	14.6
Student	4.5	5.5	5.0	5.0	4.8	5.2
Pensioner	31.7	28.1	23.0	22.1	27.1	25.0
House-Keeping	0.1	0.0	21.9	26.5	11.7	13.8

Source: Hellenic Statistical Authority (ELSTAT)

The breakdown of the HYDRIA survey participants by employment categories satisfactorily resembled that of the population of the country with the exception of male pensioners (larger percentage in the sample than in the country) and women housewives (smaller percentage in the sample than in the country).

Individuals falling to the last three categories (students/pensioners/house-keepers) are not included in the actual workforce of the country. The unemployment rate conveys the ratio of the unemployed to the economically active population (labour force) and is calculated as the quotient of the number of unemployed to the total of unemployed and employed. The percentage of unemployed calculated using the HYDRIA data is equal to 26.8%, and is sufficiently close enough to that percentage in the total population during the reporting period (26%). The corresponding percentages per age group of the HYDRIA participants are listed in the following table.

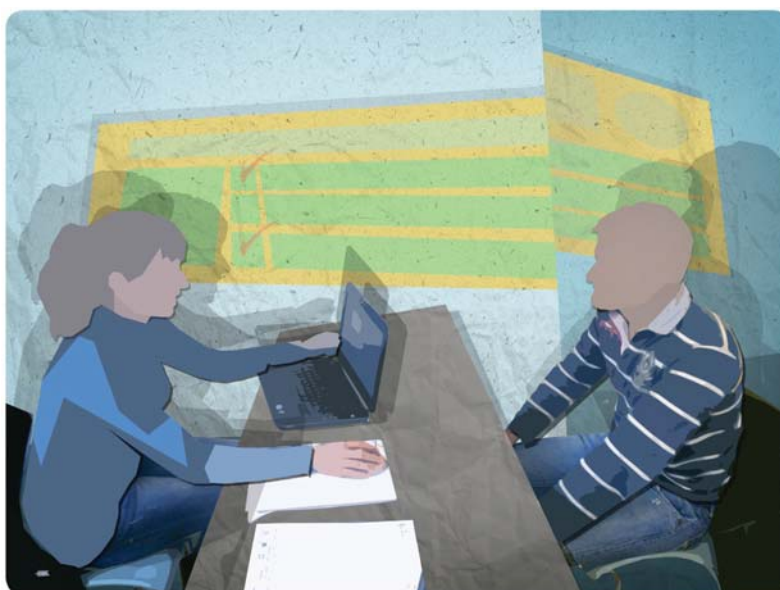
**Table A.4: Percentage (%) of unemployed of the total 4011 participants in the HYDRIA survey, by gender and age group.**

Age	Men	Women	Total
18-24 years	38.3	53.9	47.0
25-34 years	26.0	32.3	29.1
35-44 years	15.6	29.8	22.5
45-54 years	15.7	31.1	22.6
55-64 years	24.7	34.0	28.3

The unemployment rate among young people (up to 24 years of age) is more than 50% in women, and accounts for 47% of the total population. The rate in the age group of 35-54 years is twice as high for women than men.

The survey's objective was to collect health and nutrition data in a representative sample of the population in Greece (target population). Weighting factors were applied to address deviations of the study sample from the target population and to ensure the estimation of results that represent the country's population.

Data weighing is achieved through multiplying the measurements of each study participant by an extrapolation factor. The calculation of the factor used in the HYDRIA survey was based on the 2011 Greek census after projecting the census data to the reference period (2014) according to updated data obtained from the ELSTAT's Labour Force Survey (LFS) and taking into consideration: a) the sampling design, to compensate for unequal probabilities of selection (municipal/local communes and individual selection probabilities); b) the response rate by geographical region, degree of urbanisation, gender and age group; and c) the improvement of the result's accuracy through calibration, which aimed to adapt the sample distribution by gender, age group, educational level and employment status to the corresponding distribution of the adult population in Greece.



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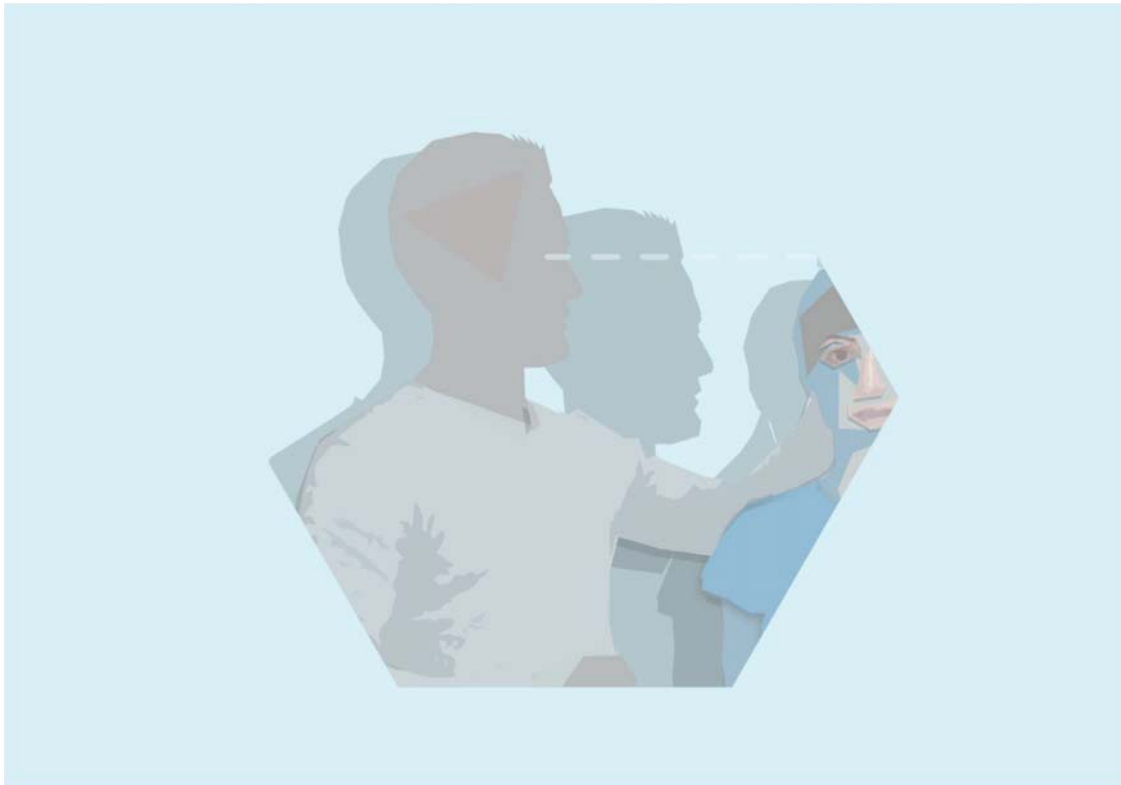


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## SECTION B



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## Health indicators of the population in Greece

This section presents indicators on the prevalence of chronic diseases and results on the participants' personal assessment of their health status.

Reporting of the indicators was based on the questionnaires participants completed during the face-to-face interviews. Specifically, participants stated if they were ill or had been ill in the previous 12 months or longer with specific diseases and if diagnosed with the disease by a doctor (self-reported data). Chronic diseases are considered those health problems or conditions that have a duration of longer than six months. Conditions characterised as chronic but have either a seasonal appearance of symptoms or periods of exacerbation and remission (although the episodes may last less than six months) were also considered. The category of chronic diseases also includes diseases that cause the individual no noticeable symptoms or symptoms that can be successfully controlled by medication.

Potential associations of qualitative characteristics (differences in proportions) between men and women, age groups or educational level categories were assessed through Chi-Square tests. The level of statistical significance of the observed differences was set at 5% ( $p$ -value = 0.05).

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**Table B.1: Prevalence (%) of chronic morbidity by gender, age group and educational level. Results are representative of the adult population in Greece (weighted percentages).**

Chronic morbidity			
	Men	Women	Total
<b>Self-reported Prevalence</b>	51.3	67.2	59.6
<b>Age</b>			
<65 years	40.6	57.8	49.3
≥65 years	87.1	92.9	90.3
<b>Educational level</b>			
<b>Individuals &lt;65 years</b>			
Low	50.0	73.7	63.1
Intermediate	36.2	51.0	43.4
High	40.4	52.0	46.2
<b>Individuals ≥65 years</b>			
Low	86.2	94.3	91.1
Intermediate	92.5	87.3	90.0
High	86.6	78.0	84.2

Three out of five adult permanent residents in Greece, stated that they suffer from a chronic disease, as declared during the interview (Table B.1). Women, in particular those up to 65 years old, reported more often than men the presence of chronic disease. Among younger people, the prevalence of chronic disease was significantly higher in men and women with a low level of education, in comparison to those with intermediate or high educational level. In the age group 65 years and over, nine out of ten said they suffered from a chronic condition; the level of education does not seem to be associated with chronic morbidity, except in the case of women in which a decrease in morbidity is observed with higher educational level.



**Table B.2: Prevalence (%) of diabetes mellitus by gender, age group and educational level. Results are representative of the adult population in Greece (weighted percentages).**

Diabetes Mellitus			
	Men	Women	Total
<b>Self-reported Prevalence</b>	10.8	11.9	11.4
<b>Age</b>			
<65 years	5.5	6.2	5.8
≥65 years	28.7	27.5	28.1
<b>Educational level</b>			
<b>Individuals &lt;65 years</b>			
Low	9.8	11.5	10.7
Intermediate	3.5	4.5	4.0
High	5.4	3.2	4.3
<b>Individuals ≥65 years</b>			
Low	29.2	29.9	29.6
Intermediate	23.5	15.3	19.5
High	31.2	9.1	25.1

One in ten adult permanent residents in Greece, suffers from diabetes mellitus (insulin dependent or not), and the proportion rises to around three in ten among those aged 65 years and over in both sexes. The level of education is inversely related to the prevalence of the disease in people aged up to 65 years, i.e. the prevalence of diabetes mellitus is higher in those in the low educational level. Among those aged 65 years and over the association remained only among women.

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**Table B.3: Prevalence (%) of acute myocardial infarction by gender, age group and educational level. Results are representative of the adult population in Greece (weighted percentages).**

Acute myocardial infarction			
	Men	Women	Total
<b>Self-reported Prevalence</b>	4.6	1.2	2.8
<b>Age</b>			
<65 years	2.0	0.5	1.2
≥65 years	13.2	3.2	7.6
<b>Educational level</b>			
<b>Individuals &lt;65 years</b>			
Low	2.8	1.0	1.8
Intermediate	1.8	0.2	1.1
High	1.6	0.3	1.0
<b>Individuals ≥65 years</b>			
Low	13.2	3.7	7.5
Intermediate	18.0	0.0	9.3
High	8.6	0.0	6.2

**Table B.4: Prevalence (%) of stroke by gender, age group and educational level. Results are representative of the adult population in Greece (weighted percentages).**

Stroke			
	Men	Women	Total
<b>Self-reported Prevalence</b>	1.8	2.0	1.9
<b>Age</b>			
<65 years	0.8	1.2	1.0
≥65 years	5.2	4.4	4.7
<b>Educational level</b>			
<b>Individuals &lt;65 years</b>			
Low	1.5	2.4	2.0
Intermediate	0.4	0.8	0.6
High	0.7	0.4	0.6
<b>Individuals ≥65 years</b>			
Low	4.6	5.0	4.8
Intermediate	1.7	0.4	1.1
High	11.3	1.9	8.7



In Greece, acute myocardial infarction affects mainly men. Of the entire population of adult men in the country, approximately 5% have suffered acute myocardial infarction and the proportion increases significantly (13%) among those of an older age. Generally, the level of education does not seem to be associated with the prevalence of the disease.



The prevalence of stroke is low in the population of Greece (approximately 2%), with no observed significant difference between sexes. After the age of 65 years the percentage of those with the disease is approximately four to five times higher for both male and female, while it does not appear to be associated with educational level.

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**Table B.5: Prevalence (%) of asthma by gender, age group and educational level. Results are representative of the adult population in Greece (weighted percentages).**

Asthma			
	Men	Women	Total
<b>Self-reported Prevalence</b>	8.0	9.1	8.6
<b>Age</b>			
<65 years	7.6	8.2	7.9
≥65 years	9.4	11.5	10.6
<b>Educational level</b>			
<b>Individuals &lt;65 years</b>			
Low	6.6	9.3	8.1
Intermediate	8.1	8.7	8.4
High	7.5	6.1	6.8
<b>Individuals ≥65 years</b>			
Low	11.3	12.3	11.9
Intermediate	6.9	6.5	6.7
High	2.7	7.9	4.1

**Table B.6: Prevalence (%) of chronic obstructive pulmonary disease by gender, age group and educational level. Results are representative of the adult population in Greece (weighted percentages).**

Chronic obstructive pulmonary disease			
	Men	Women	Total
<b>Self-reported Prevalence</b>	5.7	6.2	6.0
<b>Age</b>			
<65 years	3.3	5.3	4.3
≥65 years	13.9	8.7	11.0
<b>Educational level</b>			
<b>Individuals &lt;65 years</b>			
Low	3.2	5.7	4.6
Intermediate	3.1	5.8	4.4
High	3.9	4.1	4.0
<b>Individuals ≥65 years</b>			
Low	13.9	8.9	10.9
Intermediate	15.7	6.3	11.2
High	12.0	9.9	11.4

Approximately one in ten adult permanent residents in Greece, reported that they have had or have asthma, including allergic asthma. There does not appear to be a statistically significant association with socio-demographic characteristics of the individuals and disease prevalence.



Six percent (6%) of the adult population of the country stated that they suffer from chronic obstructive pulmonary disease (chronic bronchitis, emphysema). As expected, the prevalence of the disease is higher at older ages, with one in ten aged 65 years or over reporting suffering from the disease.



**Table B.7: Prevalence (%) of chronic depression by gender, age group and educational level. Results are representative of the adult population in Greece (weighted percentages).**

Chronic depression			
	Men	Women	Total
<b>Self-reported Prevalence</b>	3.1	11.4	7.4
<b>Age</b>			
<65 years	2.7	9.4	6.1
≥65 years	4.6	16.9	11.5
<b>Educational level</b>			
<b>Individuals &lt;65 years</b>			
Low	2.9	15.8	10.0
Intermediate	3.1	7.5	5.2
High	1.8	5.5	3.7
<b>Individuals ≥65 years</b>			
Low	4.1	16.4	11.5
Intermediate	6.9	20.5	13.5
High	4.8	17.5	8.3

Chronic depression affects more women of all ages, disease prevalence reaches 17% among women aged 65 years and over (four times that of men). In general, among older women self-reported prevalence of chronic depression does not seem to be associated with education. In contrast, among younger women, chronic depression is more prevalent among those with a lower educational attainment.



**Table B.8: Prevalence (%) of permanent traumas or injuries from accidents by gender, age group and educational level. Results are representative of the adult population in Greece (weighted percentages).**

Permanent traumas or injuries from accidents			
	Men	Women	Total
<b>Self-reported Prevalence</b>	8.4	5.8	7.1
<b>Age</b>			
18-24 years	2.5	3.6	3.0
25-64 years	9.1	4.9	6.9
≥65 years	8.6	8.8	8.7
<b>Educational level</b>			
<b>Individuals 18-24 years</b>			
Low	0.0	0.0	0.0
Intermediate	2.8	3.6	3.2
High	0.0	4.1	3.2
<b>Individuals 25-64 years</b>			
Low	11.4	4.9	7.8
Intermediate	8.2	5.2	6.7
High	8.4	4.3	6.4
<b>Individuals ≥65 years</b>			
Low	7.9	8.7	8.4
Intermediate	10.0	7.0	8.6
High	11.1	13.4	11.7

The presence of permanent traumas or injuries from accidents was reported by approximately 7% of the adult population of the country, with a marginally greater value in men. In Table B.8 the results are presented in three age groups separating young adults up to 24 years. The frequency of permanent traumas or injuries from accidents is lower among youngsters particularly in women. Among the 25-64 year old group trauma or injury occurs approximately twice as much in men than women. Educational level does not appear to be a factor associated with the condition.



**Table B.9: Prevalence (%) of chronic conditions/problems of the waist or neck by gender, age group and educational level. Results are representative of the adult population in Greece (weighted percentages).**

Chronic problems of the waist or neck			
	Men	Women	Total
<b>Self-reported Prevalence</b>	31.6	45.6	38.9
<b>Age</b>			
18-34 years	18.0	21.4	19.7
35-64 years	34.2	48.5	41.5
≥65 years	40.8	61.3	52.3
<b>Educational level</b>			
<b>Individuals &lt;65 years</b>			
Low	39.2	55.4	48.1
Intermediate	26.4	34.6	30.4
High	24.2	31.7	28.0
<b>Individuals ≥65 years</b>			
Low	41.8	63.1	54.6
Intermediate	41.4	47.4	44.3
High	35.1	57.4	41.3

Two out of five adult permanent residents in Greece stated that they have faced or are facing chronic waist or neck problems. Among people over 35 years of age, significantly more women than men reported the problem. Prevalence of waist or neck problems increases with advancing age; in those aged 65 years and older approximately one in two stated they have had or have problems of this type. Higher educational level was associated with a lower prevalence of waist or neck problems especially in younger people.

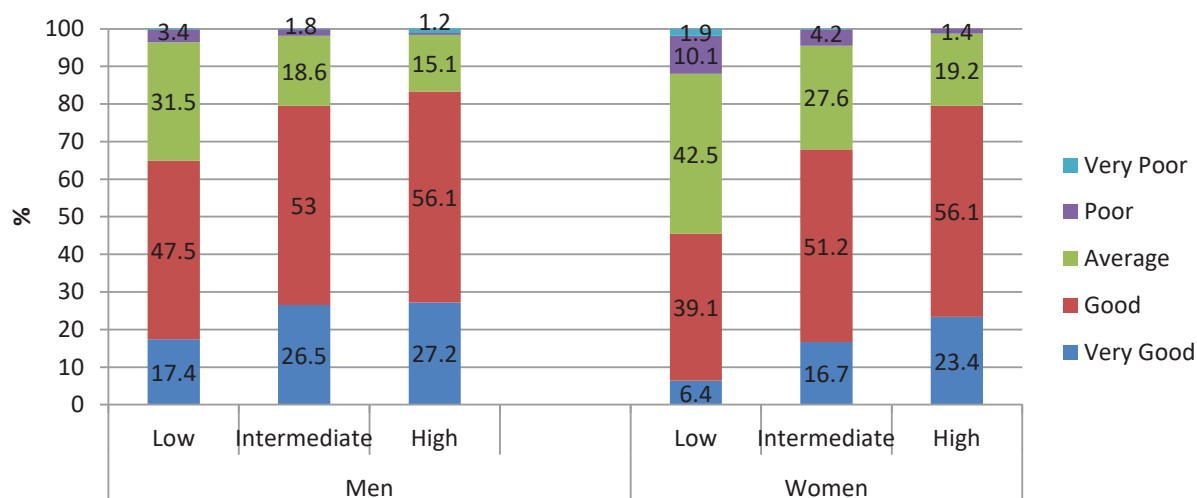
**Table B.10: Self-reported health status by gender or age group. Results are representative of the adult population in Greece (weighted percentages).**

Self-reported health status					
	Very good	Good	Average	Poor	Very poor
<b>Reported percentage (%)</b>	16.9	49.5	27.8	5.2	0.6
<b>Gender</b>					
Men	21.1	52.9	22.6	3.0	0.5
Women	13.0	46.4	32.6	7.2	0.8
<b>Age</b>					
<65 years	19.9	50.7	25.3	3.5	0.6
≥65 years	8.0	45.9	35.3	10.1	0.7

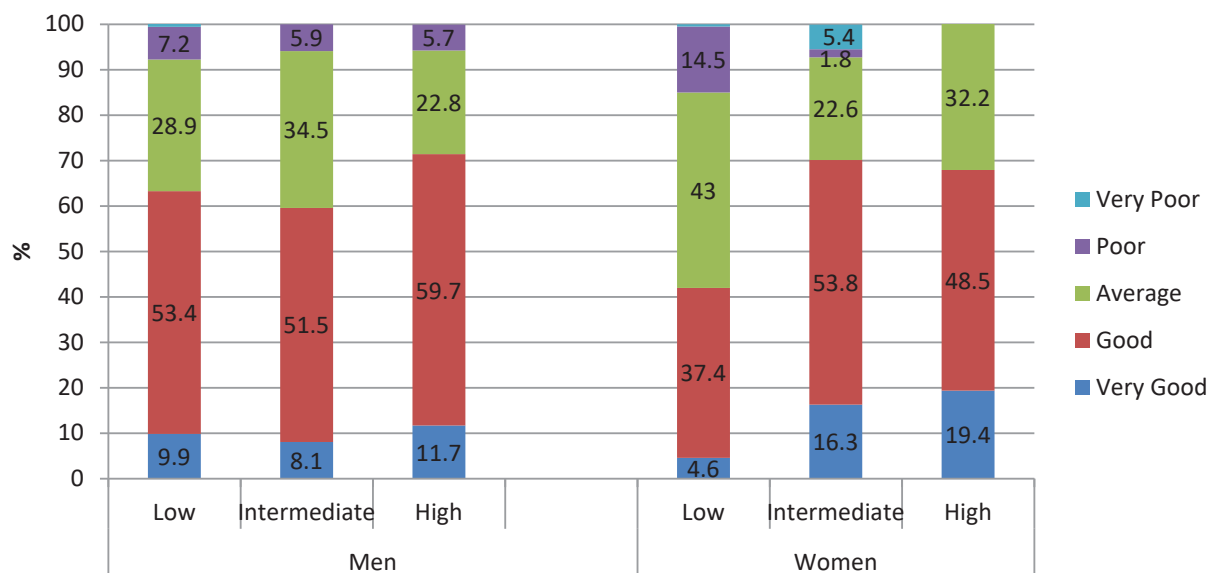
In the HYDRIA questionnaires, the section with questions on health issues started with the participant's own assessment of the general state of their health. Specifically, participants were able to choose one of five responses (very good, good, average, poor or very poor). The selections per answer are presented in Table B.10 for the total population and separately for men and women and two age groups.

Overall, two out of three adult permanent residents in Greece stated that their health is very good or good. An assessment of very good/good health is more common in men (74%) than in women (59%). Also of interest is the fact that one in two older people (65 years and older) assess their state of health to be good or very good. Differences in self-reported health status by educational level, separately for men and women are presented in Figures B.10.1 (up to 65 years) and B.10.2 (65 years and over). In the low educational level, women, regardless of age, perceive their health as average, compared with women in the intermediate or high educational level who often felt they have good or very good health. At least one in ten women at the low educational level considers their health as poor, while the proportion exceeds 14% in women over 65 years. The percentage of people who considered their health to be very poor, however, was in all cases negligible.

**Figure B.10.1: Self-reported health status among individuals aged <65 years (percentages by gender and educational level). Results are representative of the adult population in Greece (weighted percentages).**



**Figure B.10.2: Self-reported health status among individuals aged ≥65 years (percentages by gender and educational level). Results are representative of the adult population in Greece (weighted percentages).**





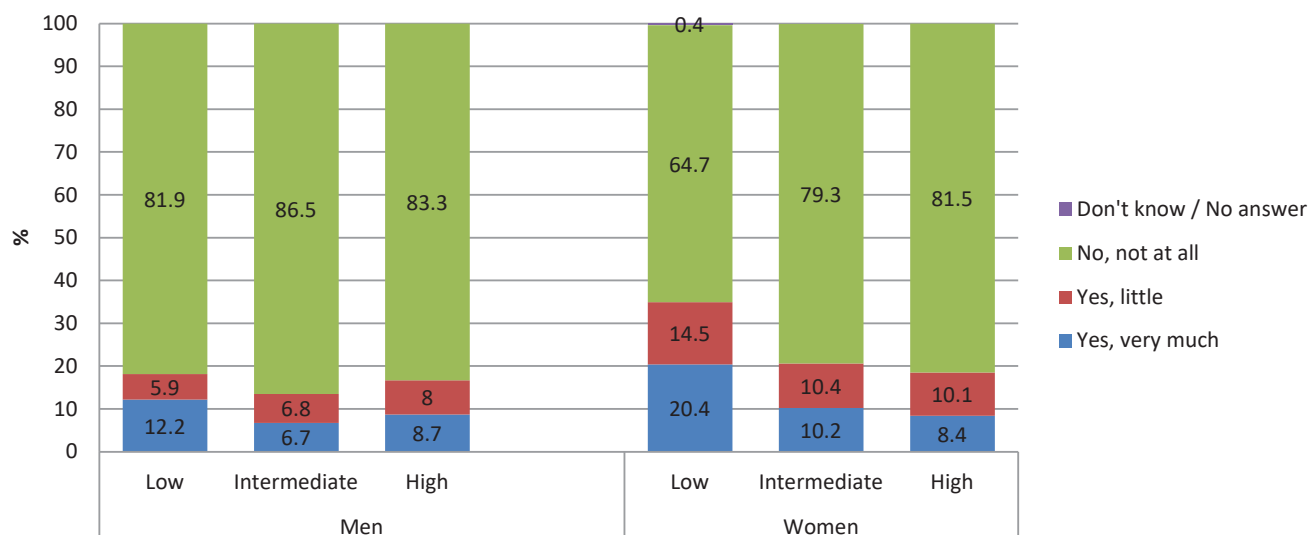
**Table B.11: Self-reported long-term restrictions on ordinary activities by gender or age group. Results are representative of the adult population in Greece (weighted percentages).**

Long-term restrictions on ordinary activities				
	Yes, very much	Yes, little	No, not at all	Don't know / No answer
<b>Reported Percentage (%)</b>	14.9	11.0	74.0	0.2
<b>Gender</b>				
Men	11.4	8.5	80.1	0.1
Women	18.1	13.3	68.4	0.2
<b>Age</b>				
<65 years	10.6	9.2	80.1	0.1
≥65 years	27.6	16.2	55.9	0.4

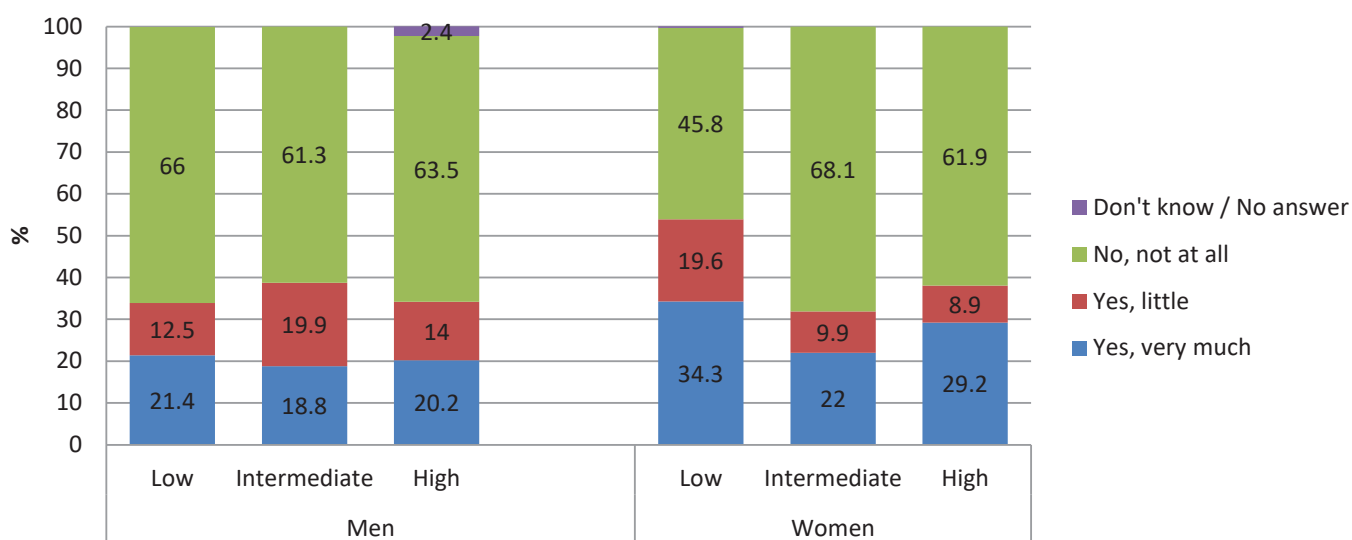
During the face-to-face interview, participants were asked to indicate if in the last six months (or more) they had reduced some of their ordinary activities or had had difficulty performing them due to health problems, physical or mental. Restrictions due to socio-economic or other non-medical factors were not taken into account. Individuals who find it difficult to cope in their daily lives due to chronic conditions tend to adjust the level of daily activities to their abilities; ordinary activities are considered to be those activities carried out by an average adult permanent resident in Greece.

Table B.11 presents the results of the participants for the entire population and separately for men and women and for two age groups. In Figures B.11.1 and B.11.2 responses are presented by gender and educational level of participants and separately for persons up to 65 years (Figure B.11.1) and for people aged 65 years and over (Figure B.11.2). Approximately one in four adult permanent residents in Greece feels restricted in his/her ordinary activities. Perceived restrictions in daily activities is more common among women (31%) than men (20%). Percentages in people aged 65 years and older are more than double compared with those in the younger age group. A low level of education appears to be more frequently associated with self-reported long-term restriction in women, but not in men.

**Figure B.11.1: Self-reported long-term restrictions on ordinary activities of persons aged <65 years by gender and educational level. Results are representative of the adult population in Greece (weighted percentages).**



**Figure B.11.2: Self-reported long-term restrictions on ordinary activities of persons aged ≥65 years by gender and educational level. Results are representative of the adult population in Greece (weighted percentages).**





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SECTION C



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## Smoking habits, somatometric characteristics, dietary intake and physical activity of the population in Greece

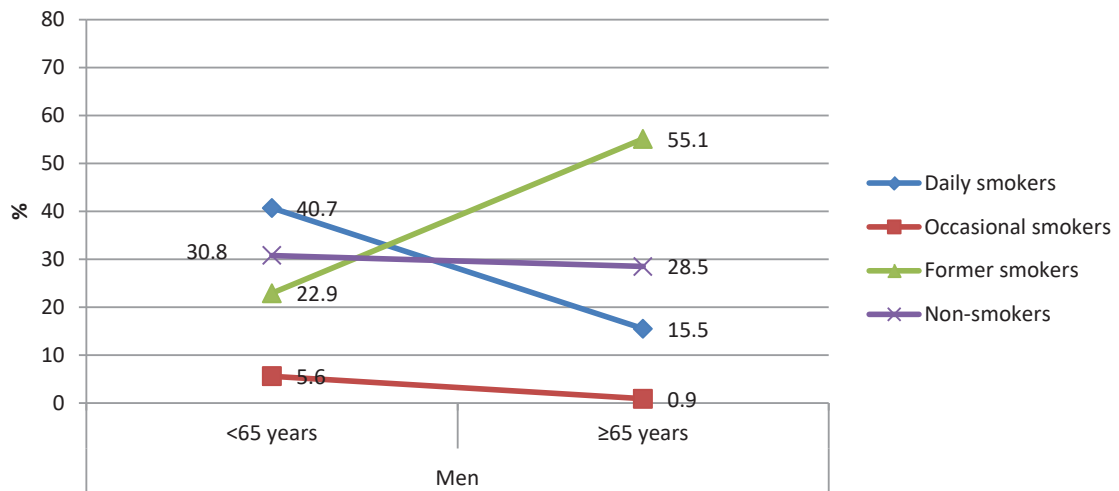
This section presents data for somatometric characteristics and dietary habits of the population and the frequency of behavioral factors associated with disease risk (smoking habit and low physical activity). The collection of dietary data included the administration of two 24-hour dietary recalls per participant together with a non-quantitative food frequency questionnaire (food propensity questionnaire). The recording of physical activity and smoking habits was based on a series of questions in accordance with the recommendations of the European Reference Centre for conducting health examination surveys (the EHES Reference Centre). Finally, the somatometric characteristics were measured by trained personnel during the baseline examination of the participants, using calibrated equipment and under the standardised protocols of the EHES Reference Centre.

**Table C.1: Prevalence of smoking (%) by gender or age group. Results are representative of the adult population in Greece (weighted percentages).**

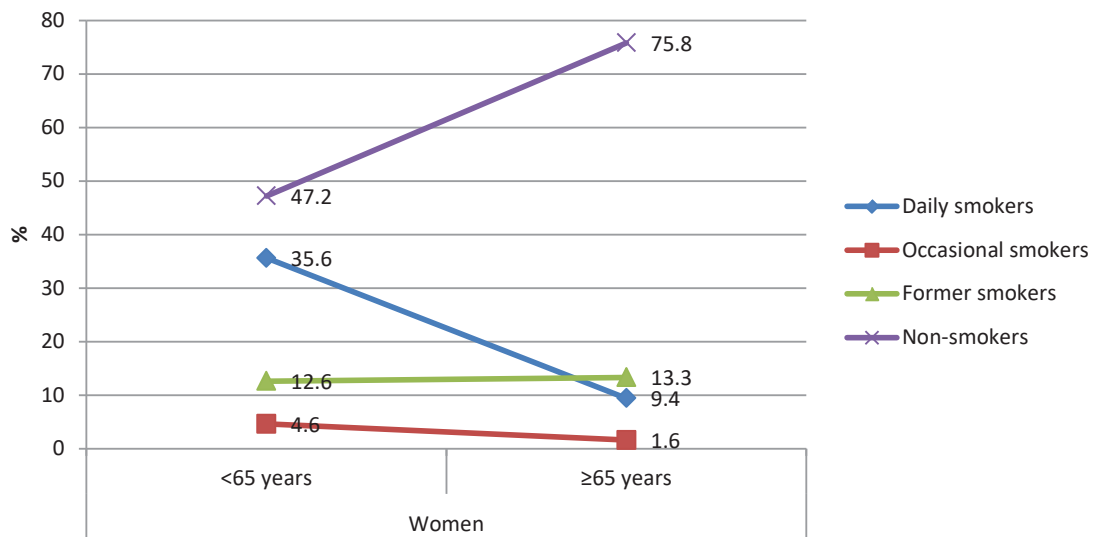
	Current smokers		Former smokers	Non-smokers
	Daily	Occasionally		
<b>Percentage</b>	31.6	4.1	21.2	43.1
<b>Gender</b>				
Men	34.9	4.5	30.4	30.2
Women	28.5	3.8	12.8	54.9
<b>Age</b>				
18-24 years	27.6	10.0	4.2	58.1
25-64 years	39.4	4.5	19.4	36.7
≥65 years	12.1	1.3	31.8	54.9



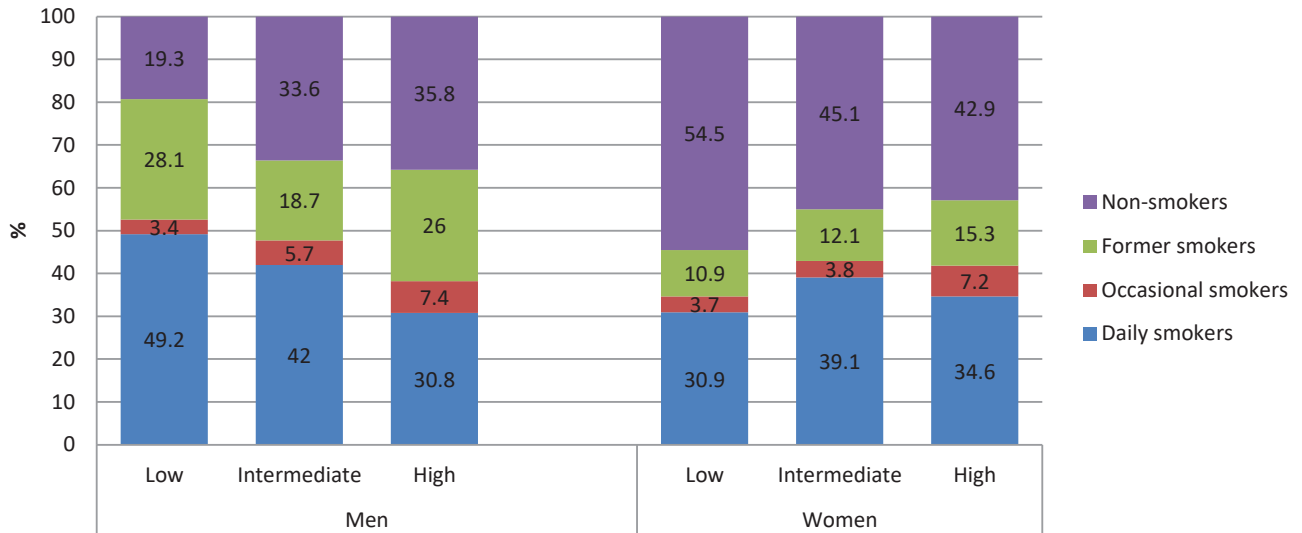
**Figure C.1.1: Prevalence of smoking (%) among men and by age group. Results are representative of the adult population in Greece (weighted percentages).**



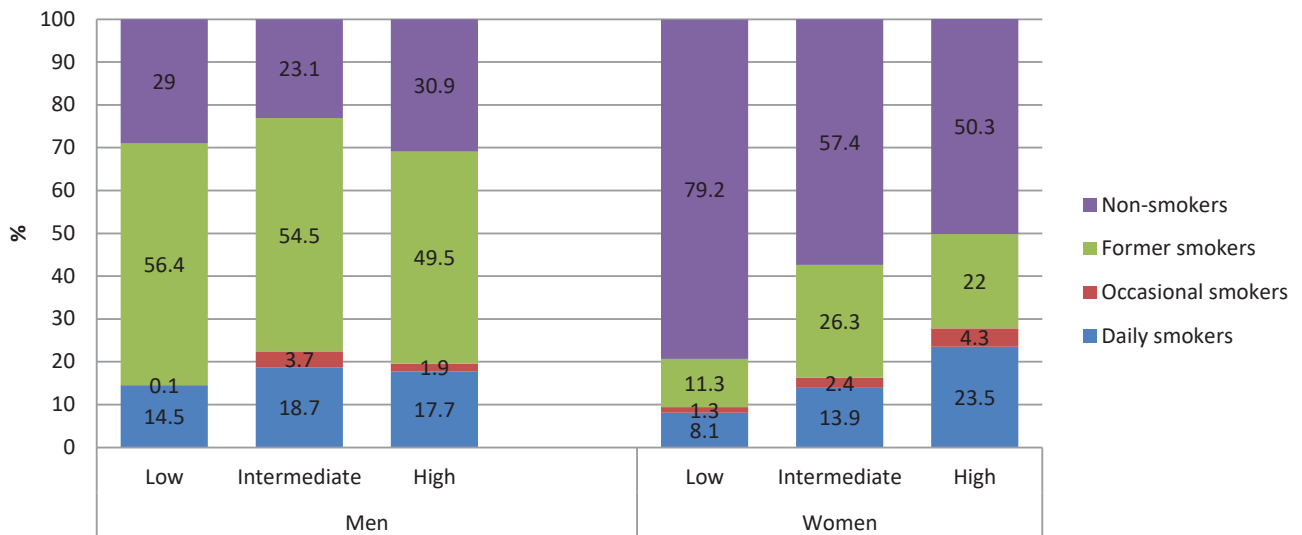
**Figure C.1.2: Prevalence of smoking (%) among women and by age group. Results are representative of the adult population in Greece (weighted percentages).**



**Figure C.1.3: Distribution of individuals (%) aged <65 years by their smoking habits, gender and educational level. Results are representative of the adult population in Greece (weighted percentages).**



**Figure C.1.4: Distribution of individuals (%) aged ≥65 years by their smoking habits, gender and educational level. Results are representative of the adult population in Greece (weighted percentages).**



Approximately three in five adult permanent residents in Greece indicated that they either smoke daily (32%), or occasionally (4%), or had smoked for at least a year at some point in their lives (21%). More men tend to smoke than women, although at least one in two self-reported that she is a non-smoker. The highest percentage of systematic smoking was observed at ages 25-64 years, where almost two in five participants reported that they smoked daily. The lowest percentage of systematic smoking was observed in older ages.

Differences in smoking habits by age group and gender are presented in Figures C.1.1 and C.1.2. Among men, younger individuals are more often smokers, whereas older individuals were more often former smokers. Being a non-smoker did not vary significantly with age. Among women, the percentage of non-smokers is higher in both age groups. However, the percentage of women who smoke daily is significantly higher in the younger age group, probably reflecting an increase in the frequency of smoking among young women.

Findings for the prevalence of smoking among men and women by age and educational level are numerous and interesting. In younger men, smoking seems to be more prevalent at the low educational level; at the high educational level, six out of ten men said they were former or non-smokers. Among older men, the educational level was not found to be associated with differences in smoking habits. Among women, the findings are exactly the reverse: lower educated women are less likely to be smokers regardless of age; among women 65 years and older the percentage of non-smokers reaches 80%. In women with high educational level, (someone could infer that are those most likely to have a higher socio-economic status), approximately one in four women is a smoker. Improved educational attainment appears to be associated with a significant increase in the percentage of smokers in older women. In summary, the results of the HYDRIA survey provide strong evidence for socio-economic disparities in the smoking habits of women and younger men.

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**Table C.2: Mean and standard deviation (SD), median (Q2), first (Q1) and third (Q3) quartiles of the distribution of somatometric characteristics by gender. Results are representative of the adult population in Greece (weighted).**

Somatometric characteristics	Men				Women			
	Mean ± SD	Q1	Median	Q3	Mean ± SD	Q1	Median	Q3
Body Mass Index, BMI (kg/m <sup>2</sup> )	28.7 ± 5.0	25.3	28.1	31.3	28.5 ± 6.1	23.8	27.7	32.3
Waist circumference (cm)	99.6 ± 13.7	90.0	99.0	108.4	90.8 ± 14.9	79.0	90.3	100.2
Waist circumference /Hip circumference	0.95 ± 0.09	0.89	0.95	1.01	0.85 ± 0.09	0.79	0.85	0.91

**Table C.3: Distribution of individuals (%) by category of Body Mass Index (BMI, kg/m<sup>2</sup>), gender or age group. Results are representative of the adult population in Greece (weighted percentages).**

	BMI < 18.5 kg/m <sup>2</sup> Underweight	18.5 ≤ BMI < 25 kg/m <sup>2</sup> Normal	25 ≤ BMI < 30 kg/m <sup>2</sup> Overweight	BMI ≥ 30 kg/m <sup>2</sup> Obese
Percentage (%)	0.9	26.8	37.4	34.9
<b>Gender</b>				
Men	0.2	22.3	43.5	34.1
Women	1.5	31.0	31.8	35.7
<b>Age</b>				
18-24 years	3.8	61.1	25.4	9.7
25-49 years	1.1	34.8	36.0	28.1
50-64 years	0.1	15.5	42.8	41.6
65-79 years	0.0	10.2	39.2	50.6
≥ 80 years	0.3	15.2	38.1	46.4

The Body Mass Index (BMI) is the most common indicator of somatometric characteristics. It is calculated by dividing body weight in kilograms by the square of height in metres. This wide application index is used in population studies as a benchmark for the weight of the general population and is a prime indicator used to estimate the degree of overweight/obesity. BMI classification indicate four groups of individuals: a) underweight (<18.5 kg/m<sup>2</sup>), normal (18.5-24.9 kg/m<sup>2</sup>), overweight (25-29.9 kg/m<sup>2</sup>) and obese (≥30 kg/m<sup>2</sup>). The higher the deviation from the recommended body weight the worse the effects on health. A higher than normal BMI has been reported to increase the risk of (indicatively): diabetes mellitus, hypertension, heart disease, certain cancers and overall mortality.

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In addition to the BMI the HYDRIA participants' somatometric characteristics were evaluated through measurements of waist and hip circumferences. Those measurements were made on the basis of standardised procedures in the participants' baseline examination during the fieldwork. Waist circumference is widely used as an evaluation index for central (abdominal) obesity, while the waist to hip circumference ratio is used as an additional marker for the central obesity. Central obesity appears to be associated with increased risk of cardiovascular disease, hypertension, dyslipidemia and type II diabetes. According to the World Health Organisation (WHO)<sup>4</sup>, waist circumference measurements of greater than 94 cm (men) and 80 cm (women) are associated with an increased risk of metabolic complications and an even greater risk for those with a waist circumference greater than 102 cm (men) and 88 cm (women). Regarding the ratio of waist/hip circumferences, according to the WHO, values equal to or greater than 0.90 (men) and 0.85 (women) appear to be associated with a significantly increased risk of metabolic complications.

The mean BMI of adult permanent residents in Greece indicate an overweight population. Additionally, 50% of the male population has a waist circumference equal to or greater than 99.0 cm, values which are associated with an increased risk of metabolic complications and 50% of the female population has a waist circumference measurement of 90.3 cm or greater; values that are also considered to be elevated.

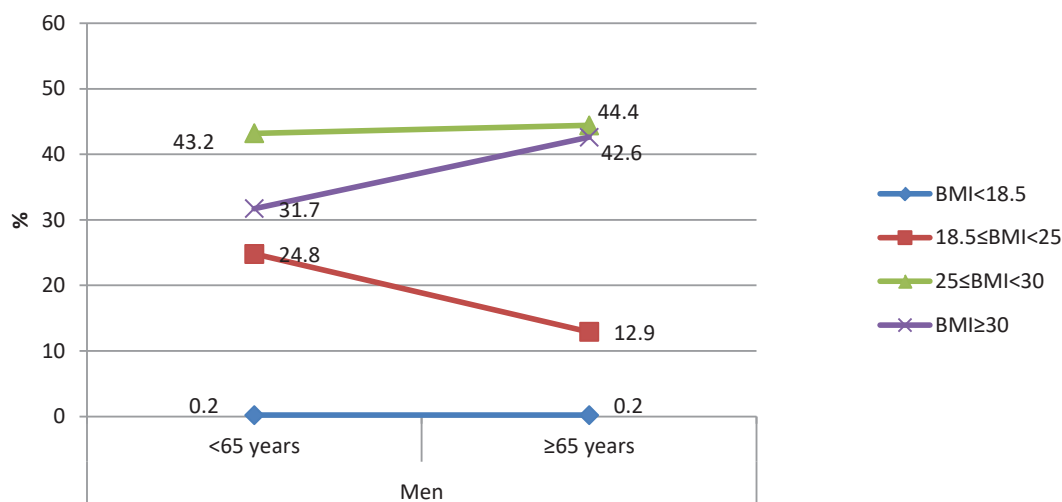
The results presented in Table C.3 highlight the problem of overweight and obesity as a major public health issue in Greece, with a total of seven out of ten adult permanent residents in the country being overweight or obese. The problem is more prevalent in men (78%) than in women (68%). However, men are more often overweight, whereas women are more often obese. Normal BMI values were observed more frequently in the younger age group of 18-24 years, although even in young adults one in three is overweight or obese. The proportion of people with normal BMI decreases with advancing age up to 80 years old. The observed increase in the percentage of people with normal BMI over 80 years is not easy to interpret and may reflect the greater survival of people with normal weight. The highest percentage of overweight people (43%) occurred in the age group of 50-64 years and, one in two adults aged 65-79 years were obese.

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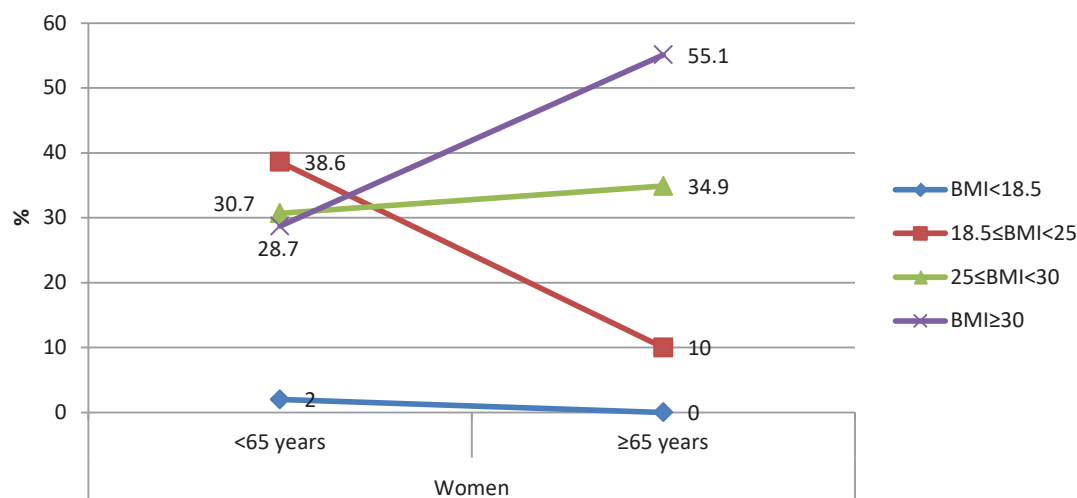
<sup>4</sup>. Waist circumference and waist-hip ratio: report of a WHO expert consultation, Geneva, 8-11 December 2008. [http://apps.who.int/iris/bitstream/10665/44583/1/9789241501491\\_eng.pdf?ua=1](http://apps.who.int/iris/bitstream/10665/44583/1/9789241501491_eng.pdf?ua=1)



**Figure C.3.1: Distribution of men (%) by Body Mass Index and age group. Results are representative of the adult population in Greece (weighted percentages).**

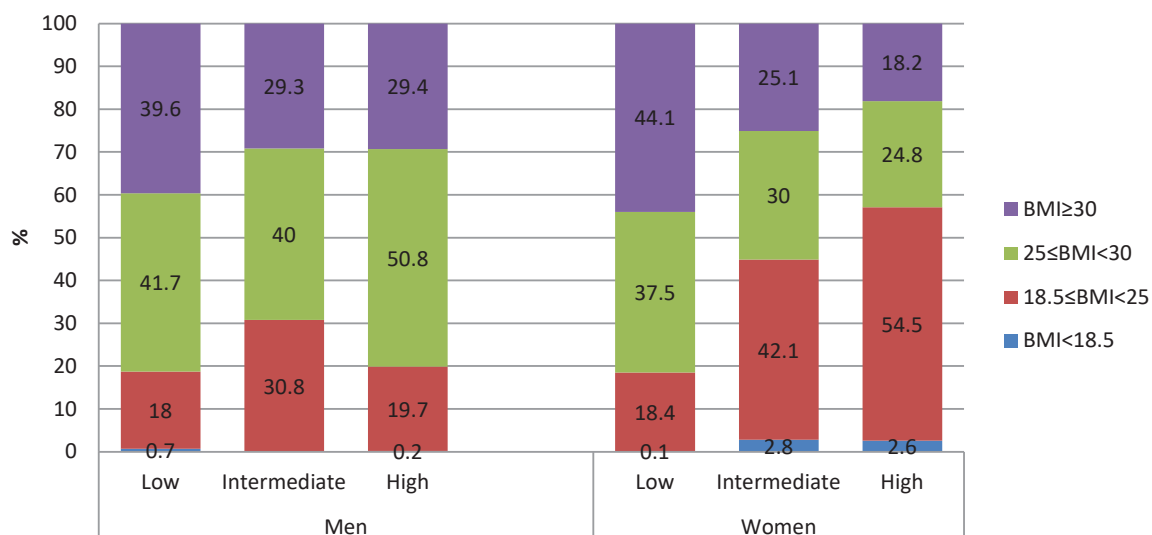


**Figure C.3.2: Distribution of women (%) by Body Mass Index and age group. Results are representative of the adult population in Greece (weighted percentages).**

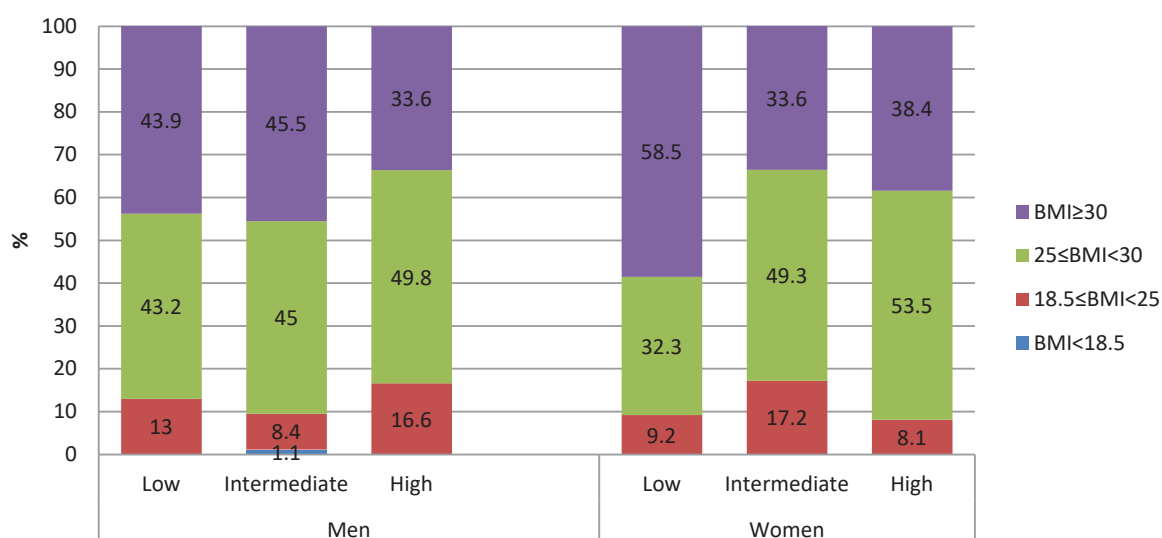


Variations in the distribution of individuals by BMI category and age group are shown in Figures C.3.1 (men) and C.3.2 (women). Most men are overweight regardless of age group; the proportion of men who are obese increases substantially after the age of 65 years. The majority of women aged up to 65 years old had a BMI within the normal range. Among women aged 65 years and over, however, the proportion of those with normal BMI decreases dramatically, with a significant increase in the percentage of obese and to a lesser extent of overweight women.

**Figure C.3.3: Distribution of individuals (%) aged <65 years by gender, Body Mass Index (BMI) and educational level. Results are representative of the adult population in Greece (weighted percentages).**



**Figure C.3.4: Distribution of individuals (%) aged ≥65 years by gender, Body Mass Index (BMI) and educational level. Results are representative of the adult population in Greece (weighted percentages).**



The Figures C.3.3 (individuals <65 years) and C.3.4 (individuals ≥65 years) present the distribution of individuals by gender, BMI category and level of education. Eight out of ten men aged up to 65 years with either low or high educational attainment are overweight or obese. However, those with a higher educational level are more likely to be overweight than obese, whereas those in the low educational level, and possibly with a lower socio-economic status, are almost as often equally overweight or obese. In women up to 65 years, improving education levels are associated with normal BMI values. In particular, younger women with a high educational level had normal BMI at nearly three times the proportion of women with normal BMI in the low educational level. The proportion of individuals with BMI levels within the recommended limits is significantly reduced after the age of 65 years. Both men and women in the older age group are overweight or obese, and the risk appears to be independent of the educational level.

The collection of dietary intake data included two interviewer-administered 24-hour dietary recalls per participant (one face-to-face at baseline and a second about a month later through telephone) and completion of a non-quantitative food frequency questionnaire (food propensity questionnaire) also at baseline. The open-ended 24-hour recall method allows for a complete and detailed recording of food and beverages consumed on a particular day and is the indicated method for assessing the dietary intake of a population (nutrition surveillance). Although the recording of two dietary recalls per person allows calculation of the average usual daily dietary intake of the group (the population), it is not adequate enough to fully assess the distribution of the usual daily intake due to the apparent large variability occurred. The calculation of the average intake is necessary for an understanding of the dietary habits of the population. However, knowledge of the characteristics of the distribution of intake is essential to calculate dietary deviations and estimate the percentage of individuals above or below a standard (i.e. current nutrition recommendations) or further, to examine relationships between diet and health. To assess the distribution of the usual dietary intake, the data of the two 24-hour recalls can be combined with the food propensity questionnaire, which contains information about the usual food choices and preferences of the individual through appropriate statistical methods.

The results of the HYDRIA survey for daily fruit and vegetable consumption, ethanol intake and the percentage of the contribution of macro-nutrients in the daily energy intake (nutrient densities) are presented in Table C.4 and Figures C.4.1 (males) and C.4.2 (females). For the calculation of dietary intake values, the data of the two 24-hour recalls and the food propensity questionnaire were taken into account and correction factors were applied to capture within-person variation in intake and mitigate its unwanted effect. It is also noted that the daily intake of fruit, vegetables and ethanol concern raw data before any adjustment to control for variations in total energy intake of individuals (energy-adjustment).

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HYDRIA Project 45



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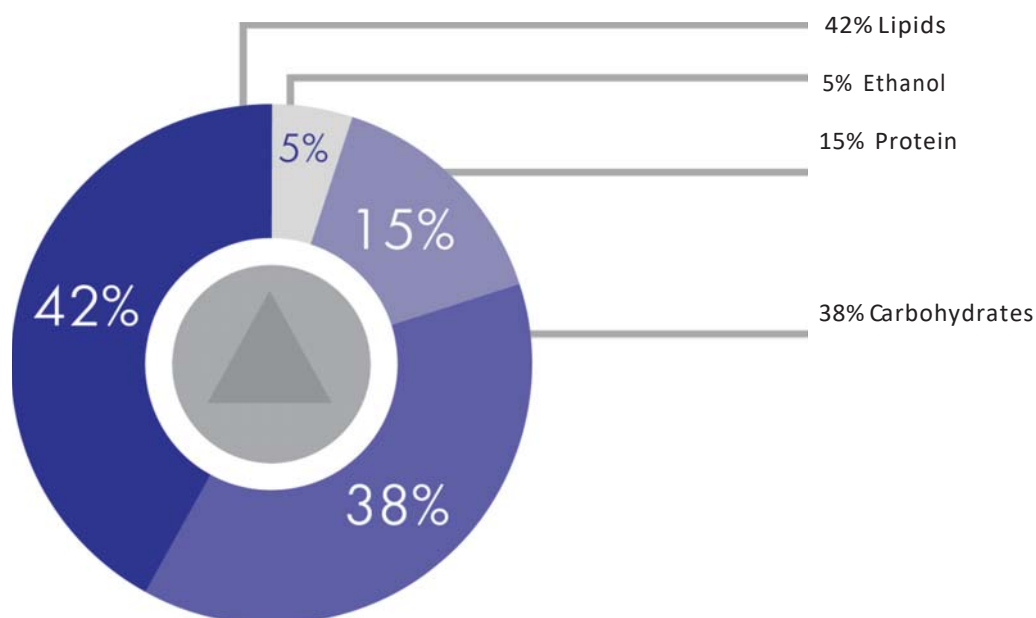


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**Table C.4: Average and 5th, 25th, 50th-median, 75th and 95th percentiles of intake of fruit, vegetables and ethanol (g/day), overall and by gender. Results are representative of the adult population in Greece (weighted).**

Intake, g/day	Mean	P5	P25	Median	P75	P95
<b>Fruit</b>						
Total	117	4	28	82	173	344
Men	111	3	23	73	165	347
Women	121	5	34	90	179	342
<b>Vegetables</b>						
Total	188	71	127	177	237	341
Men	212	88	149	202	264	371
Women	166	62	112	157	209	300
<b>Ethanol</b>						
Total	9.9	0.1	0.9	4.0	13.2	38.2
Men	16.0	0.4	3.4	10.5	22.4	49.8
Women	4.2	0.1	0.4	1.5	5.0	17.8

**Figure C.4.1: Contribution (%) of the macro-nutrients to total daily energy intake (nutrient densities) for MEN.**



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HYDRIA Project 46



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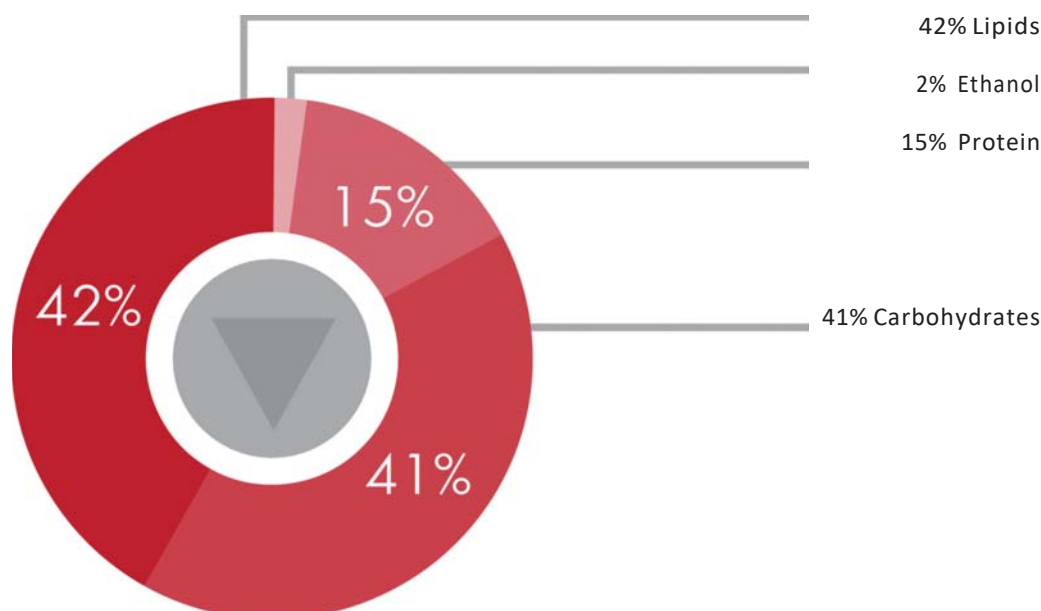


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**Figure C.4.2: Contribution (%) of the macro-nutrients to total daily energy intake (nutrient densities) for WOMEN.**



The average fruit and vegetable consumption in Greece has declined in recent decades and is now below international guidelines. Taking into account the recommendations of the WHO (consumption greater than 400 grams of fruit and vegetables per day to reduce the risk of chronic diseases)<sup>5</sup> only 25% of the adult population of the country appears to have an intake of sufficient quantities. Males seem to prefer eating vegetables rather than fruits and women prefer to consume more fruit than men. The median consumption of vegetables (177 g / day) approaches the corresponding mean value, suggesting that individuals in Greece consume vegetables regularly and without major deviations in their daily intakes. Macro-nutrient intake does not differ significantly between men and women. The lower ethanol intake in women is compensated by a greater daily intake of carbohydrates by women compared to men.

<sup>5</sup> World Health Organisation website <http://www.who.int/dietphysicalactivity/en/>

**Table C.5: Mean and standard deviation (SD), median (Q2), first (Q1) and third (Q3) quartiles of the total energy expenditure through physical activity (MET-hours/day)\* by gender or age group. Results are representative of the adult population in Greece (weighted).**

	Mean $\pm$ SD	Q1	Median	Q3
<b>Total</b>	44.0 $\pm$ 9.6	37.3	42.1	48.1
<b>Gender</b>				
Men	43.9 $\pm$ 11.1	36.3	41.3	48.3
Women	44.0 $\pm$ 8.0	38.4	42.8	48.0
<b>Age</b>				
18-24 years	41.5 $\pm$ 8.5	34.9	39.9	45.5
25-64 years	45.6 $\pm$ 10.1	38.7	43.7	49.9
$\geq$ 65 years	40.4 $\pm$ 7.2	35.7	39.5	44.2

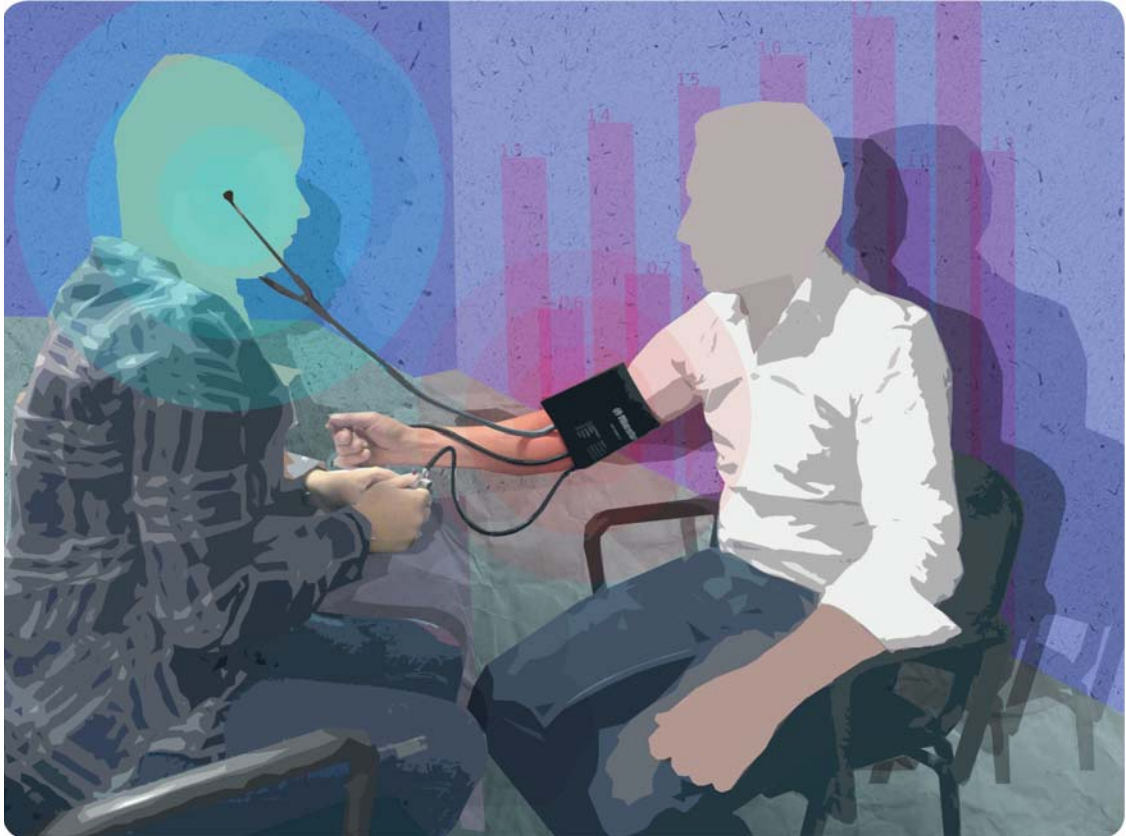
Table C.5 shows the daily energy expenditure expressed in metabolic equivalents (Metabolic Equivalents of Tasks, MET<sup>6</sup>). The metabolic equivalent is a measure of the intensity of physical activities and expresses the ratio of the energy cost of a particular activity to the resting metabolic rate (Resting Metabolic Rate). A MET equal to 1 corresponds to the energy consumed by a person in a resting condition and is equal to 3.5 ml O<sub>2</sub> per minute and kilogram of body weight or 1 kcal per hour and kg body weight. The metabolic equivalent values per day (MET-hours/day) indicate an index of energy expenditure during a 24-hour period and allows the evaluation of the population's physical activity. According to the results of the HYDRIA survey, the average energy expenditure of a 24-hour period did not significantly vary in both sexes. In contrast, significant differences were observed by age group.

\*. *The calculation was based on the Compendium of Physical Activity, 2011 (Ainsworth BE, Haskell WL, Herrmann SD, Meckes N, Bassett Jr DR, Tudor-Locke C, Greer JL, Vezina J, Whitt-Glover MC, Leon AS. 2011 Compendium of Physical Activities: a second update of codes and MET values. Medicine and Science in Sports and Exercise, 2011;43(8):1575-1581).*

<sup>6</sup>. *Ainsworth BE, Haskell WL, Herrmann SD, et al. 2011 Compendium of Physical Activities: a second update of codes and MET values. Med Sci Sports Exerc. 2011;43(8):1575-81.*







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SECTION D



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## **BLOOD PRESSURE, HEART RATES AND LEVELS OF BIOCHEMICAL MARKERS REPRESENTATIVE FOR THE POPULATION OF GREECE**

During the baseline examination, blood pressure and heart rates were assessed and blood samples were drawn in accordance with standardised procedures and by trained physicians. Results are presented below.

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**Table D.1: Mean and standard deviation (SD), median (Q2), first (Q1) and third (Q3) quartiles of the distribution of blood pressure levels and heart rates. Results are representative of the adult population in Greece (weighted).**

Blood pressure	Mean $\pm$ SD	Q1	Median	Q3
Systolic blood pressure (mmHg)	124 $\pm$ 17	112	122	133
Diastolic blood pressure (mmHg)	77 $\pm$ 11	69	77	84
Heart rate measurement (beats/minute)	70 $\pm$ 10	63	69	75

During the examination, the physician took three measurements of the participants' blood pressure levels with a mercury sphygmomanometer with a period of one minute between measurements. The levels of systolic and diastolic blood pressure per person were determined by the average of the three measurements. In turn, the heart rate was measured in the radial artery, once per person and within a one-minute period.

According to the guidelines of international Scientific Societies<sup>7</sup>, hypertension is defined as the condition of the systolic blood pressure equal to or greater than 140 mmHg and diastolic blood pressure equal to or greater than 90 mmHg. In addition, 60-100 heart beats per minute are considered normal<sup>8</sup>.

The mean and median levels of systolic and diastolic blood pressure in a representative sample of adult permanent residents in Greece are within the normal or borderline normal range as defined by current guidelines. The blood pressure levels of 75% of the population are characterised as ideal, normal or borderline normal.

Table D.2 below presents the prevalence of hypertension by gender, age group and educational level. Evidence of hypertension was established based on the existence of at least one of the following criteria: (a) a self-reported previous diagnosis (b) an individual under medication to treat hypertension (c) raised mean blood pressure values after three measurements, particularly systolic blood pressure of  $\geq 140$  mmHg and/or diastolic blood pressure of  $\geq 90$  mmHg.

<sup>7</sup> Mancia G., Fagard R., et al. 2013 ESH/ESC guidelines for the management of arterial hypertension: the Task Force for the management of arterial hypertension of the European Society of Hypertension (ESH) and of the European Society of Cardiology (ESC) *European Heart Journal*. 2013;34:2159–2219

<sup>8</sup> American Heart Association. Target Heart Rates [http://www.heart.org/HEARTORG/GettingHealthy/PhysicalActivity/FitnessBasics/Target-Heart-Rates\\_UCM\\_434341\\_Article.jsp](http://www.heart.org/HEARTORG/GettingHealthy/PhysicalActivity/FitnessBasics/Target-Heart-Rates_UCM_434341_Article.jsp)



**Table D.2: Prevalence (%) of evidence of hypertension\* by gender, age group and educational level. Results are representative of the adult population in Greece (weighted percentages).**

	Men	Women	Total
<b>Total Prevalence</b>	45.8	37.9	41.7
<b>Age</b>			
18-24 years	8.6	1.1	4.8
25-64 years	38.2	23.8	30.9
≥65 years	82.4	83.3	82.9
<b>Educational Level</b>			
<b>Individuals &lt;65 years</b>			
Low	48.2	39.7	43.5
Intermediate	29.2	15.6	22.6
High	33.6	10.6	22.1
<b>Individuals ≥65 years</b>			
Low	83.8	85.7	85.0
Intermediate	75.6	71.7	73.8
High	81.4	60.7	75.7

Approximately two out of five adult permanent residents in Greece bear evidence of hypertension, since they mentioned a prior diagnosis of the disease and/or are under a anti-hypertensive treatment and/or were found to have elevated blood pressure levels in the baseline examination. Evidence of hypertension was more frequent in men than women. The prevalence of hypertension was found to increase dramatically with age, with about four out of five individuals aged 65 years and over bearing signs of the disease. Higher educational attainment in women and younger men was associated with a significant reduction in the prevalence of hypertension.

\* Evidence of hypertension was established based on the existence of at least one of the following criteria: (a) a self-reported previous diagnosis (b) an individual under medication to treat hypertension (c) raised mean blood pressure values after three measurements, particularly systolic blood pressure of  $\geq 140$  mmHg and/or diastolic blood pressure of  $\geq 90$  mmHg.

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**Table D.3: Mean and standard deviation (SD), median (Q2), first (Q1) and third (Q3) quartiles of the distribution of total and HDL\* cholesterol levels. Results are representative of the adult population in Greece (weighted).**

Blood Lipids	Mean $\pm$ SD	Q1	Median	Q3
Serum total cholesterol (mg/dl)	195.4 $\pm$ 39.2	168	193	221
HDL cholesterol (mg/dl)	58.1 $\pm$ 15.6	47	57	68

\* HDL: High Density Lipoprotein

Levels of total and HDL-cholesterol in the blood are risk indicators for atherosclerotic cardiovascular disease (coronary heart disease, stroke, peripheral vascular disease). The higher the total cholesterol and the lower the HDL-cholesterol levels in the blood, the higher the risk of the occurrence of disease. It is also noted that high levels in HDL-cholesterol exert a protective effect.

According to current recommendations for adults<sup>9</sup>, desirable total cholesterol levels are regarded as <200 mg/dl, borderline high levels are between 200 and 239 mg/dl, and  $\geq$ 240 mg/dl are considered high. An HDL cholesterol value of <40 mg/dl is considered low and a value of  $\geq$ 60 mg/dl is considered high (i.e. recommended). According to the results of the HYDRIA survey, 75% of the population has a serum total cholesterol level of less than 221 mg/dl, i.e. content levels considered desirable or borderline high. The average value of the HDL cholesterol levels is also characterised as satisfactory, although 50% of the population have serum HDL cholesterol levels of less than the recommended 60 mg/dl.

<sup>9</sup>. *Third Report of the National Cholesterol Education Program (NCEP) Expert Panel on Detection, Evaluation, and Treatment of High Blood Cholesterol in Adults (Adult Treatment Panel III) Final Report. Circulation. 2002;106:3143*



**Table D.4: Prevalence (%) of hypercholesterolemia\* by gender, age group and educational level. Results are representative of the adult population in Greece (weighted percentages).**

	Men	Women	Total
<b>Total Prevalence</b>	13.9	13.0	13.4
<b>Age</b>			
18-24 years	2.3	0.4	1.4
25-64 years	16.4	14.5	15.5
≥65 years	10.6	13.1	12.0
<b>Educational Level</b>			
<b>Individuals &lt;65 years</b>			
Low	21.7	21.0	21.4
Intermediate	13.3	10.3	11.9
High	11.5	8.6	10.1
<b>Individuals ≥65 years</b>			
Low	10.6	12.1	11.5
Intermediate	12.9	18.2	15.4
High	8.2	19.6	11.3

\* Serum total cholesterol levels  $\geq 240$  mg/dl.

Table D.4 presents the percentage of individuals with serum total cholesterol levels greater than or equal to 240 mg/dl, based on measurements carried out on a blood sample taken on the day of the baseline examination. The 13% of the population has elevated serum total cholesterol levels without, however, levels varying significantly between sexes. The highest percentage of individuals with hypercholesterolemia indications was observed in ages of 25-64 years in both sexes. Educational attainment in men and women up to 65 years old, was directly related with lower percentage of hypercholesterolemia, while in older people educational level was not found to be associated with the prevalence of hypercholesterolemia.



**Table D.5: Prevalence (%) of low HDL cholesterol levels\* by gender, age group and educational level. Results are representative of the adult population in Greece (weighted percentages).**

	Men	Women	Total
<b>Total Prevalence</b>	16.0	3.8	9.7
<b>Age</b>			
18-24 years	7.3	2.2	4.8
25-64 years	17.4	4.4	10.9
≥65 years	15.1	2.6	8.1
<b>Educational Level</b>			
<b>Individuals &lt;65 years</b>			
Low	20.5	4.6	11.7
Intermediate	14.1	4.9	9.7
High	16.6	2.5	9.5
<b>Individuals ≥65 years</b>			
Low	17.5	2.8	8.6
Intermediate	12.8	0.9	7.2
High	5.9	3.1	5.2

\* Levels of serum HDL cholesterol <40 mg/dl.

Approximately one in ten permanent residents in Greece have serum HDL cholesterol levels of less than 40 mg/dl, based on measurements carried out on a blood sample taken on the day of the baseline examination. The proportion of individuals with low serum HDL cholesterol levels is significantly higher in men than women. Between individuals of different ages, the highest percentage of men and women with low levels of serum HDL cholesterol is observed in the age group of 25-64 years. Finally, low levels of serum HDL cholesterol did not appear to be generally associated with the participant's educational attainment.

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**Table D.6: Mean and standard deviation (SD), median (Q2), first (Q1) and third (Q3) quartiles of the distribution of glycosylated (glycated) hemoglobin levels (GHbA1c). Results are representative of the adult population in Greece (weighted).**

	Mean $\pm$ SD	Q1	Median	Q3
Glycosylated hemoglobin, GHbA1c (%)	5.3 $\pm$ 0.7	4.9	5.2	5.5

Glycosylated (glycated) hemoglobin is a valid indicator of the presence of diabetes mellitus, since it reflects the average blood glucose levels over the previous time period and can be determined without the requirement of a fasting sample. Normal physiological values range between 4% and 6%. In accordance with international guidelines<sup>10</sup>, glycosylated hemoglobin value  $\geq 6.5\%$  is considered as an indication for the presence of diabetes mellitus. According to the results of the HYDRIA survey, the mean glycosylated hemoglobin level of adult permanent residents in Greece is within the physiologically normal range. However, it should be noted that reliable conclusions regarding the prevalence of diabetes mellitus in the population requires the assessment and evaluation of additional indicators.



<sup>10</sup> American Diabetes Association. *Standards of medical care in diabetes—2015*. *Diabetes Care* 2015;38(suppl 1):S1-S93.

International Diabetes Federation Guideline Development Group *Global guideline for type 2 diabetes mellitus*. *Diabetes Res Clin Pract.* 2014;104:1–52.

World Health Organization (WHO), *Abbreviated report of a WHO consultation. Use of Glycated Haemoglobin (HbA1c) in the Diagnosis of Diabetes Mellitus*. 2011

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SECTION E



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## Medication intake

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During the face-to-face interviews participants reported all medications and dietary supplements they take regularly, including in particular those they had taken in the last week and in the last 24 hours. At the same time, participants were asked to bring to the examination site the packaging for the medication they take regularly.

The medication categories reported by study participants are listed in Table E.1. The categorisation is based on the Anatomical Therapeutic Classification system (ATC), which has been recommended by WHO and adopted by the Greek National Organisation for Medicines (EOF).

Table E.1 lists in descending order (from high to low) percentages of participants taking medication in the various categories. The majority of adult participants (about one in four) permanent residents in Greece, take medication to treat hypertension. Listed are medications to reduce blood cholesterol levels (taken by one in five), for thyroid therapy, the treatment of thrombosis and for diabetes mellitus (about one in ten in all three cases). Antidepressants are taken by 5% of the population. Approximately 5% of the population also stated that they are taking medication to reduce anxiety.

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**Table E.1: Percentage (%) of individuals by categories of medication taken. Results are representative of the adult population in Greece (weighted percentages).**

Medication Categories	%
Drugs for the treatment of hypertension <sup>a</sup>	27.1
Lipid modifying agents	20.5
Thyroid therapy	12.3
Antithrombotic agents	12.3
Drugs used in diabetes	8.5
Antiinflammatory and antirheumatic products, non-steroids	8.3
Antidepressants	4.8
Anxiolytics	4.6
Antianemic preparations (not including dietary supplements)	3.7
Drugs for obstructive airway diseases	3.6
Cardiac therapy <sup>b</sup>	3.2
Drugs used in benign prostatic hypertrophy	3.0
Drugs affecting bone structure and mineralization (not including dietary supplements)	2.7
Antigout preparations	2.6
Antihistamines for systemic use	2.4
Antiepileptics	2.1
Corticosteroids for systemic use	1.3
Antineoplastic agents, Hormone antagonists and related agents, Immunosuppressants, Immunostimulants	1.3
Antipsychotics	1.0
Sex hormones and modulators of the genital system	0.9
Hypnotics and sedatives	0.8
Anti-dementia drugs	0.8
Anti-Parkinson drugs	0.4

<sup>a</sup>. Including antihypertensives, diuretics, beta blocking agents, calcium channel blockers and agents acting on the renin-angiotensin system.

<sup>b</sup>. Including cardiac glycosides, antiarrhythmics, cardiac stimulants excluding cardiac glycosides and vasodilators used in cardiac diseases.

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## Conclusions and proposals for policy actions

Medicine (either preventive or therapeutic) aims to maximize quality and duration of life. The HYDRIA survey allowed recording health, nutrition and related indicators in a representative sample of the adult population in Greece and further collected information on the prevalence of known risk factors so as to assist in the identification of problems, with significant predictive value for the future health of the population in the country.

It is quite alarming that the HYDRIA results indicate that the health of women and men in Greece tends to deteriorate due to the smoking epidemic that continues to affect the population, the high and increasing prevalence of obesity, the progressive abandonment of physical activity, the insufficient control of hypertension and diabetes mellitus, and the progressive departure from the principles of the traditional Mediterranean diet.

Lifestyle choices, reflecting human behaviour are the focus of contemporary preventive medicine. It is thus difficult to comprehend how educated and rational thinking people can smoke regularly, avoid any form of exercise, and accept lifestyles that are linked to the unhealthy obesity.

Health policy measures are generally directed towards disease therapy and the corresponding necessary infrastructure. Measures and procedures that focus on areas related to disease prevention rather have the potential to impact more on health indices than investment in high technology, which nevertheless, is also required.

Any attempt to effectively address and improve public health problems includes both short and long-term measures. Both should be based on systematic mapping of the problem, prioritisation of potential alternatives or complementary measures, implementation according to the best known practices and lastly but not least, the evaluation of their efficiency. Suggestions may include the following action objectives:

(A) Information and education, with the formation of short video messages (spots), special modules in television shows and the implementation of integrated intervention projects aimed at activating the community, with schools as the benchmark.

(B) Preventing deviation and ensuring effective compliance with current recommendations through training seminars addressed to healthcare professionals and collaboration with health centres and hospitals throughout the country for the practical implementation of objectives.

(C) Developing and institutionalizing methods and structures to ensure long-term monitoring of health of the population by ensuring the periodic collection of comparable data on health-related indicators in the population through standardised procedures.

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Nutrition and Health of the Population in Greece



Nutrition & Health of the Population in Greece

[http://www.hhf-greece.gr/hydria-nhns.gr/index\\_eng.html](http://www.hhf-greece.gr/hydria-nhns.gr/index_eng.html)

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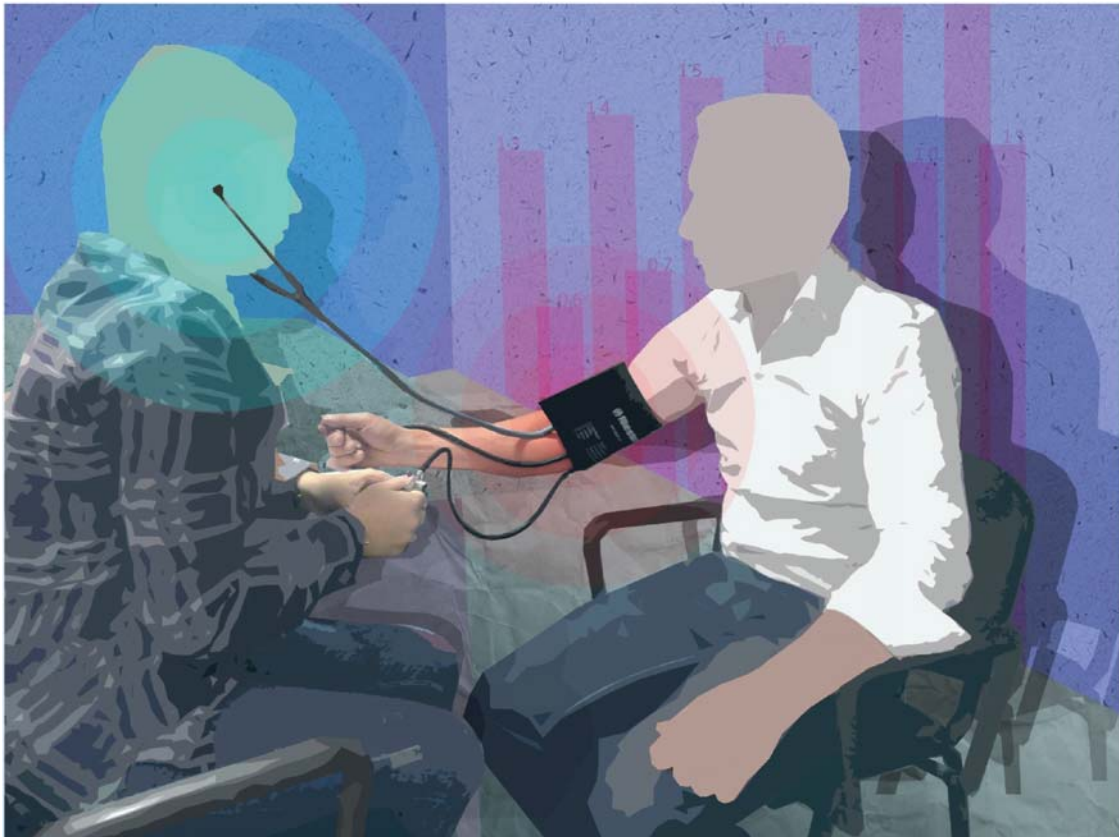


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Nutrition & Health of the Population in Greece

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