ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΡΗΤΗΣ - ΤΜΗΜΑ ΙΑΤΡΙΚΗΣ

ΠΡΟΓΡΑΜΜΑ ΜΕΤΑΠΤΥΧΙΑΚΩΝ ΣΠΟΥΔΩΝ

ΔΗΜΟΣΙΑ ΥΓΕΙΑ-ΠΡΩΤΟΒΑΘΜΙΑ ΦΡΟΝΤΙΔΑ ΥΓΕΙΑΣ-ΥΠΗΡΕΣΙΕΣ ΥΓΕΙΑΣ

ΜΕΤΑΠΤΥΧΙΑΚΗ ΕΡΓΑΣΙΑ

Τίτλος

«Η συχνότητα της γνωσιακής διαταραχής στη Πρωτοβάθμια Φροντίδα Υγείας: Η συσχέτισή της με επιλεγμένους κλινικούς φαινότυπους»

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1. **Λιονής Χρήστος**
2. **Συμβουλάκης Εμμανουήλ**
3. **Τσιλιγιάννη Ιωάννα**

Ηράκλειο, [Ιούνιος 2020]

Ευχαριστίες

Θα ήθελα να ευχαριστήσω από καρδιάς τους αγαπητούς καθηγητές:

Κύριο Λιονή,

Κύριο Συμβουλάκη,

Κυριά Τσιλιγιάννη

Για την αμέριστη βοήθεια, υποστήριξη και καθοδήγησή τους.

ΠΕΡΙΕΧΟΜΕΝΑ

Περίληψη Μεταπτυχιακής Εργασίας

Τίτλος εργασίας: Η συχνότητα της γνωσιακής διαταραχής στη Πρωτοβάθμια Φροντίδα Υγείας: Η συσχέτισή της με επιλεγμένους κλινικούς φαινότυπους.

Του: Μπερτσιά Αντωνίου

Υπό τη επίβλεψη των: 1. Λιονή Χρήστο, Καθηγητή
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Ημερομηνία: Ιούνιος 2020

Εισαγωγή

Ο όρος «γνωσιακή διαταραχή» στους ηλικιωμένους χρησιμοποιείται συχνά για να περιγράψει μια κατάσταση κατά την οποία υπάρχει μια μετρήσιμη έκπτωση στις γνωσιακές ικανότητες του ατόμου, συμπεριλαμβανομένων της μνήμης και της ικανότητας σκέψης. Η γνωσιακή διαταραχή ποικίλει σε βαρύτητα και συμπεριλαμβάνει ήπιες ηλικιακά-σχετιζόμενες μεταβολές στις γνωσιακές λειτουργίες του ατόμου, την ήπια γνωσιακή διαταραχή έως και την άνοια που θεωρείται η πιο σοβαρή από αυτές τις καταστάσεις. Η γνωσιακή διαταραχή έχει σημαντικό αντίκτυπο στη ποιότητα ζωής των πασχόντων αλλά και των οικογενειών/φροντιστών τους. Η Πρωτοβάθμια Φροντίδα Υγείας (ΠΦΥ) μπορεί να διαδραματίσει ένα σημαντικό ρόλο διασφαλίζοντας την έγκαιρη διάγνωση της γνωσιακής διαταραχής. Ένα εμπόδιο προς αυτή τη κατεύθυνση είναι ότι το φορτίο της αλλά και οι προσδιοριστές της είναι ακόμα εν μέρει άγνωστοι. Σκοπός αυτής της μελέτης είναι να εκτιμήσει το φορτίο της γνωσιακής διαταραχής στους ηλικιωμένους επισκέπτες δομών ΠΦΥ και να διερευνήσει τη συσχέτισή της με συγκεκριμένους κλινικούς φαινοτύπους.

Μέθοδοι

Μια συγχρονική μελέτη έλαβε χώρα μεταξύ Μαρτίου 2013 και Μαΐου 2014 σε 14 δομές ΠΦΥ τόσο σε αγροτικές όσο και σε αστικές περιοχές του νομού Ηρακλείου Κρήτης. Επιλέξιμοι συμμετέχοντες ήταν διαδοχικοί επισκέπτες των επιλεγμένων δομών ηλικίας 60 ετών και άνω. Για την εκτίμηση της γνωσιακής λειτουργίας των συμμετεχόντων χρησιμοποιήθηκε ο διαγνωστικός έλεγχος Mini Mental State Examination (MMSE). Η διερεύνηση των πιθανών συσχετίσεων μεταξύ επιλεγμένων κλινικών φαινοτύπων και της ύπαρξης γνωσιακής διαταραχής πραγματοποιήθηκε με μοντέλα πολλαπλής λογιστικής παλινδρόμησης. Τα χρόνια νοσήματα ταξινομήθηκαν κατά κατηγορίες ICD-10 ενώ υπολογίστηκε ο δείκτης συ-νοσηρότητας Charlson.

Αποτελέσματα

Συνολικά 3,140 συμμετέχοντες συμμετείχαν στη μελέτη με μέση ηλικία 73.7±7.8 έτη (43.2% ήταν άντρες). Η μέση βαθμολογία του διαγνωστικού ελέγχου MMSE ήταν 26.0 (±3.8); 26.7 (±3.5) στους άντρες και 25.4 (±3.9) στις γυναίκες; $p<0.0001$). Με χαμηλή βαθμολογία στον έλεγχο MMSE βρέθηκαν το 20.2% των συμμετεχόντων; 25.9% των γυναικών και 12.8% των αντρών; $p<0.0001$. Η παρουσία ψυχικών και συμπεριφορικών διαταραχών (F00-F99) συσχετίζονταν με αυξημένο κίνδυνο για ύπαρξη γνωσιακής διαταραχής τόσο στους άντρες όσο και στις γυναίκες (Odds Ratio [OR] 1.71 στις γυναίκες, OR 2.27 στους άντρες; $p<0.0001$). Η παρουσία νοσημάτων του νευρικού συστήματος (G00-G99) συσχετίζονταν με αυξημένο κίνδυνο για ύπαρξη γνωσιακής διαταραχής και στα δύο φύλα (OR 1.65; $p=0.032$ στις γυναίκες) και (OR 1.84; $p=0.046$ στους άντρες). Η παρουσία μυοσκελετικών νοσημάτων και νοσημάτων του συνδετικού ιστού (M00-M99) συσχετίζονταν με μειωμένο κίνδυνο για ύπαρξη γνωσιακών διαταραχών στις γυναίκες μόνο (OR 0.77; $p=0.042$), ενώ οι τραυματισμοί και οι συνέπειες εξωτερικών αιτιών (S00-T98) με αυξημένο κίνδυνο για ύπαρξη γνωσιακών διαταραχών στους άντρες (OR 2.99; $p=0.005$). Ο δείκτης συ-νοσηρότητας Charlson βρέθηκε να σχετίζεται σημαντικά με την ύπαρξη γνωσιακή διαταραχής στους άντρες συμμετέχοντες μόνο (OR 1.31; $p=0.004$). Τέλος, ο αριθμός των χρονιών νοσημάτων δεν ήταν σημαντικός προσδιοριστής της ύπαρξης γνωσιακής διαταραχής ούτε στους άντρες, ούτε στις γυναίκες ($p>0.005$ και στα δύο φύλα).

Συμπεράσματα

Η συγκεκριμένη μελέτη υπέδειξε ένα σχετικά υψηλό επιπολασμό της γνωσιακής διαταραχής ανάμεσα στους ηλικιωμένους επισκέπτες των δομών ΠΦΥ στη Κρήτη και αναγνώρισε συγκεκριμένους κλινικούς φαινοτύπους οι οποίοι σχετίζονται με αυτή. Τα ευρήματα αυτής της μελέτης τονίζουν την ανάγκη για την έγκαιρη διάγνωση, τη μείωση του κινδύνου και την ολοκληρωμένη διαχείριση ασθενών με γνωσιακή διαταραχή στα πλαίσια της ΠΦΥ.

Λέξεις κλειδιά:
Πρωτοβάθμια Φροντίδα Υγείας (ΠΦΥ), γνωσιακές διαταραχές, πολύ-νοσηρότητα, άνοια, νόσος Alzheimer, Ήπια Γνωσιακή διαταραχή

Abstract

Title: The burden of cognitive impairment in Primary Health Care: Associations with selected clinical phenotypes.

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Introduction

In the elderly, cognitive impairment is used to describe a condition in which there is a measurable decline in cognitive abilities, including memory, and thinking skills. It ranges from mild age-related changes in cognitive functioning through to mild cognitive impairment (MCI) and its most severe presents as dementia. Cognitive impairment has a significant impact on the quality of life of individuals and their caregivers. The role of Primary Health (PHC) could be instrumental by ensuring early identification of cognitive disorders. An obstacle to this is that the burden and the determinants of cognitive dysfunction in patients visiting the PHC services are still largely unknown. The aim of this study is to assess the burden of cognitive impairment among elders visiting primary care practice settings, to explore potential associations of cognitive impairment and selected clinical phenotypes.

Methods

A cross-sectional study was conducted between March 2013 and May 2014 in 14 PHC units located in both rural and urban areas of the Heraklion district in Crete, Greece. Eligible participants were consecutive visitors of the selected PHC units aged at least 60 years. The Mini Mental State Examination [MMSE] was used to indicate cognitive status. Associations between cognitive impairment and selected clinical phenothypes were assessed using logistic regression. Chronic illnesses were classified in ICD-10 categories and the Charlson co-morbidity index was computed.

Results

A total of 3,140 PHC participants were analysed (43.2% male; with a mean age of 73.7±7.8 years). The average MMSE score was 26.0 (±3.8); 26.7 (±3.5) in male and 25.4 (±3.9) in female participants ($p<0.0001$). Low MMSE scores were detected in 20.2% of participants; 25.9% for females and 12.8% for males; $p<0.0001$. Presence of mental and behavioural disorders (F00-F99) increased the odds of cognitive impairment both in female and male participants (Odds Ratio [OR] 1.71 in females, OR 2.27 in males; $p<0.0001$ in both). Presence of diseases of the central nervous system (G00-G99) increased the odds of cognitive impairment both in females (OR 1.65; $p=0.032$) and in males (OR 1.84; $p=0.046$). Presence of diseases of the musculoskeletal system and connective tissue (M00-M99) were associated with reduced the odds of cognitive impairment in females only (OR 0.77; $p=0.042$), while injury, poisoning and certain other consequences of external causes (S00-T98) increased the odds of cognitive impairment in male participants only (OR 2.99; $p=0.005$). The Charlson co-morbidity index was associated with increased odds of cognitive impairment in males (OR 1.31; $p=0.004$), while the number of chronic conditions was not a significant predictor neither in female or male participant ($p>0.05$ in both).

Conclusions

This study identified a relatively high prevalence of cognitive impairment according to MMSE scores amongst elder visitors of PHC practices the island of Crete, Greece and has identified several clinical phenotypes which were associated with cognitive decline. Findings serve as a call to action in terms of the need for early identification, risk reduction and management of cognitive impairment in PHC settings.

Key words:
primary health care, cognitive impairment, multi-morbidity, dementia, Alzheimer's disease, mild cognitive impairment

Introduction

There has been an overall increase in the longevity of the adult population over time. As a consequence, certain chronic illnesses and conditions have become more prevalent, with memory loss and cognitive impairment disorders being amongst the most common (1). In the elderly the term "cognitive impairment" is used to describe a condition in which there is a measurable decline in cognitive abilities, including memory, and thinking skills (2). Cognitive impairment can range from some mild age-related changes in cognitive functioning through to mild cognitive impairment (MCI) and its most severe presents as dementia (3, 4). Cognitive impairment and dementia doesn't just affect individuals but also affects and changes the lives of their family members. A detailed description (including signs and symptoms) of MCI and dementia is presented below:

Mild Cognitive Impairment (MCI)

MCI can be defined as the stage between the expected cognitive decline of normal aging and the more serious decline observed in demented people. It typically involves problems with memory, language, thinking and judgment that are greater than normal age-related changes.

Some signs and symptoms of MCI include (5):

- Forgetting important events such as appointments or social engagements.
- Losing the train of thought or the thread of conversations, books or movies.
- Feeling increasingly overwhelmed by making decisions, planning steps to accomplish a task or understanding instructions.
- Starting to have trouble finding your way around familiar environments.
- Becoming more impulsive or show increasingly poor judgment.

Most of the time family, relatives and friends are the first who notice these changes. Symptoms of MCI may remain stable for years, progress to Alzheimer's disease or another type of dementia, or improve over time. Current evidence indicates that MCI often, but not always, develops from a lesser degree of the same types of brain changes seen in Alzheimer's disease or other forms of dementia.

Dementia

On the other hand most common signs and symptoms of Dementia include cognitive changes like (6):

- Memory loss.
- Difficulty communicating or finding words.
- Difficulty with visual and spatial abilities.
- Difficulty reasoning or problem-solving.
- Difficulty handling complex tasks.
- Difficulty with planning and organizing.
- Difficulty with coordination and motor functions.
- Confusion and disorientation.

Besides cognitive changes, Dementia symptoms include psychological changes as well, which include:

- Personality changes
- Depression
- Anxiety
- Inappropriate behavior
- Paranoia
- Agitation
- Hallucinations

Types of dementias:

Alzheimer's disease: Alzheimer's disease is the most common cause of dementia. Although not all causes of Alzheimer's disease are known, it is suggested in the literature that a small percentage are related to mutations of three genes, which can be passed down from parent to child. While several different genes are probably involved in Alzheimer's disease, one important gene that increases risk is apolipoprotein E4 (APOE). Alzheimer's disease patients have plaques and tangles in their brains. Plaques are clumps of a protein called beta-amyloid, and tangles are fibrous tangles made up of tau protein. It's thought that these clumps damage healthy neurons and the fibers connecting them.

Vascular dementia: This second most common type of dementia is caused by damage to the brain vessels. Blood vessel problems can cause stroke or damage the brain in other ways, such as by damaging the fibers in the white matter of the brain. The most common symptoms of vascular dementia include difficulties with problem-solving, slowed thinking, focus and organization. These tend to be more noticeable than memory loss.

Lewy body dementia: Lewy bodies are abnormal clumps of protein that have been found in the brains of people with Lewy body dementia, Alzheimer's disease and Parkinson's disease. Common signs and symptoms include visual hallucinations and problems with focus and attention. Other signs include uncoordinated or slow movement, tremors, and rigidity (parkinsonism).

Frontotemporal dementia: This is a group of diseases characterized by the breakdown (degeneration) of nerve cells and their connections in the frontal and temporal lobes of the brain, the areas generally associated with personality, behavior and language. Common symptoms affect behavior, personality, thinking, judgment, and language and movement.

Mixed dementia: Autopsy studies of the brains of people 80 and older who had dementia indicate that many had a combination of several causes, such as Alzheimer's disease, vascular dementia and Lewy body dementia.

Background: What is known?

Southern European countries including Portugal, Spain, France, Greece and Italy have reported higher rates of dementia than other parts of Europe (7). In Greece, little is known about the burden and epidemiology of cognitive impairment at the population level and, in particular, in primary care settings which cover most rural and semi-urban settings. According to Alzheimer Europe it is estimated that the total population prevalence of dementia in Greece is 1.77% of the total population, a rate which exceeds the EU-28 average of 1.55% (7). A cross-sectional study conducted in centers for the elderly and in public healthcare services in northern Greece in (2001) reported that 37.6% of male and 41.6% of female patients aged over 65 scored below 24 points on the Mini-Mental Status Examination (had MMSE score ≤24; (8). A second study by Tsantali et. al (2012) in hospital outpatients reported mean average MMSE scores ranging from a high of 25.2 (SD = 3.6) among adults aged 66-70 years

to a low of 19.5 (SD = 5.5) among those aged 86-90 years (9). A population-based cohort study (HELIAD study) conducted in Larissa (central Greece) reported a mean MMSE score of 26.6 (SD = 3.2) points among literate and 18.9 (SD = 3.8) points among illiterate adults aged 65 years or older, the overall prevalence of dementia was 5.0%, with 75.3% of the cases attributed to Alzheimer disease. (10). Another study of the same cohort calculated the age and gender standardized prevalence of MCI in those aged 65 and older in Greece at 13.11%, with every additional year of age increasing the odds of prevalent MCI by 7.4% and every additional year of education decreasing the odds by 6.3% (11). In the island of Crete, a recent study (parts of which will be used in this present work) estimated the prevalence of dementia at 10.8% (9.7% to 11.9%) and the prevalence of MCI at 32.4% (30.8% - 34.0%) amongst individuals visitors of PHC services, aged 60 years or older (12).

Socio-economic and health dimensions of dementia

Dementia is a costly condition in its social, economic, and health dimensions. It is estimated that 47 million people worldwide were living with dementia in 2015, and this number is projected to triple by 2050 (2, 5). The total estimated worldwide costs of dementia were US$ 604 billion in 2010. In high-income countries, informal care (45%) and formal social care (40%) account for the majority of costs, while the proportionate contribution of direct medical costs (15%) being much lower (6). In low-income and lower-middle-income countries direct social care costs are small, and informal care costs (i.e. unpaid care provided by the family) predominate. Changing population demographics in many low and mid income countries may lead to a decline in the ready availability of extended family members in the coming decades (1, 6-8).

Risk factors for dementia and mild cognitive impairment

Risk-factors for cognitive impairment and dementia are divided into the non-modifiable and modifiable. The non-modifiable are genetic risk factors including the Apolipoprotein E (APOE) e4 allele, age, and female gender (13). With the absence of a disease-modifying mechanism/treatment, risk reduction remains a key strategy in the reduction of disease burden (4, 14).

A recent paper by Baumgart et al. (2015) summarized the modifiable modifiable risk factors for age-related cognitive impairment as well as available treatments (14).

These include midlife obesity and hypertension, history of depression, current smoking, traumatic brain injury and sleep disturbances. On the other hand, protective factors included the years of extensive formal education, physical activity, adherence to the Mediterranean diet and moderate alcohol consumption. Finally, the roles of hyperlipidemia and social engagement remain unclear (14). In general, there have been notable inconsistencies among observational studies Importantly, it has been stressed in the literature that in the relative importance of protective factors identified by observational studies are inconsistent, possibly due to complex interactions with demographic factors varying gender and age effects (15-17).

The important role of primary health care (PHC) in the detection of cognitive impairment has been widely discussed in the literature (7). Primary care providers are typically the first health care professionals to observe patients with signs of probable cognitive impairment (8). Evidence indicates, however, that a substantial proportion of patients who meet the criteria for cognitive impairment or dementia never receive a formal diagnosis or are diagnosed in the final stages of the disease trajectory course (9, 10). This may be attributed to the lack of practical clinical guidelines specific clinical practices that can be readily incorporated to the busy schedule of PHC professionals (11). The importance of an early diagnosis has been emphasized and there is growing evidence that early diagnosis is associated with increased quality of life for both patients and their caregivers (12).

The genetically homogeneous rural population on the island of Crete has historically had relatively a low prevalence of most chronic diseases (18). In the last 50 years, however, Since the 1960s there has been a dramatic rise in the prevalence of obesity, physical inactivity and tobacco use among thein the Cretan population of Crete (19, 20).

Thalis-University of Crete: A multi-disciplinary center of excellence for the study of Alzheimer's disease and related disorders

Recently, a multi-disciplinary research network for the study of dementia and Alzheimer's disease was established within the Faculty of Medicine at the University of Crete, Greece (12). This network includes scientists and practitioners from various medical disciplines including General Practitioners (GPs) and nurses serving in the community, as well as secondary health care specialists (geriatricians, neurologists,

neuropsychologists and psychiatrists). National funding was received to undertake a project to create a clinical and research network of excellence within the University of Crete, to develop diagnostic tools for the detection of Alzheimer's disease and to identify epidemiologic and genetic determinants factors contributing to the onset, development and progress of the disease.

Structure of the Thalis-University of Crete project

As previously mentioned the Thalis University of Crete project was a multi-disciplinary project. The participating clinics within the School of Medicine (University of Crete, Greece) were:

1) The Clinic of Social and Family Medicine.
2) The Department of Internal Medicine.
3) The Department of Psychiatry.
4) The Department of Neurology.

The overall goal of the project was to recruit 3200 individuals aged 60 years or older visiting selected PHC units of the Heraklion district in Crete, Greece and measure the cognitive status. Those detected with a probable cognitive impairment would then be referred to a team of secondary health-care experts for a complete neuro-psychologic examination.

Aim of the study

The present work utilized data from the initial phase of the Thalis- University of Crete project, with the aim to measure the burden of cognitive impairment in individuals aged 60 years or older, visitors of selected PHC units and report on its potential associations with multi-morbidity and specific clinical phenotypes.

Objectives of the study

Specific research questions were:

- Is there any association between cognitive impairment and the number of chronic illnesses?
- Is there any association between cognitive impairment and the presence of chronic illnesses and conditions classified in ICD-10 categories?

The research hypothesis that drives this study is that the identification of specific clinical phenotypes in combination with the Mini Mental State Examination test could promote early identification of cognitive impairment in older individuals visiting PHC services.

Methods

Setting

A cross-sectional study was conducted between March 2013 and May 2014 in well-defined PHC settings in the prefecture of Heraklion on the island of Crete, Greece. Eligible units were staffed by GPs who were members of a previously established PHC research network coordinated by the Clinic of Social and Family Medicine, Faculty of Medicine, University of Crete. Fourteen PHC units from a total of 22 eligible units participated in the study: Eleven public PHC practices (two organized health centers and nine satellite practices) located in rural and semi-urban areas, serving a total population of 100,800 residents; and three urban PHC units (one public and two private) in the city of Heraklion, serving a total population of 174,000 residents.

Population and inclusion criteria

Eligible participants were persons aged 60 years or older, who were consecutive visitors in the participating PHC units, for any reason other than urgent care. Acutely ill patients or those requiring urgent referral to a secondary health care center were excluded. Established diagnosis of dementia or MCI was not an exclusion factor.

Measurements

A structured and pre-tested questionnaire was used to collect information from patients and caregivers on the following variables: socio-demographics (age, gender, place of residency, marital status, number of children, number of housemates, current/former employment status, number of rooms in the house, living situation, level and years of formal education received), health and lifestyle habits (smoking and alcohol consumption, number of days/week patient walked and total time of walking), self-reported night sleep duration (in hours) and presence of insomnia symptoms (difficulty falling asleep [DFA] or maintaining sleep [DMS], and early morning awakening [EMA]) (21, 22), and presence of chronic non-communicable, neurological or psychiatric illnesses and prescribed medication. Chronic conditions were self-reported by patients, or reported by their caregivers and cross-validated by their GPs against the patient's electronic health record. Chronic conditions were then classified into ICD-10 categories (yes/no) and the Chalrson co-morbidity index was

computed for each participant (23). Participants were also administered the Greek version of the MMSE (24, 25) to assess general cognitive ability and the Barthel index of Activities of Daily Living (ADL) (26, 27) was completed as part of the interview with the participant or caregiver. Finally, anthropometric measurements were measures by the interviewer (weight, height, waist circumference).

Definitions

The Greek version of MMSE has been validated and cut-off scores of 23/24 were found to have high specificity, sensitivity and positive predictive value (12, 25) for detecting severe cognitive impairment or dementia in accordance with the original validation study of the English version (24). In view, however, of the very high percentage of persons who had attained ≤6 years of formal education in the present, largely rural, sample (81.7%), we used education-adjusted MMSE cutoffs of ≤24/30 (for those with >6 years of formal education) and ≤23/30 (for those with ≤6 years) to classify participants in the low MMSE group (12, 25). A Barthel index score of 90/90 was used to indicate complete independence in activities of daily living (26). Prolonged sleep was defined as reporting ≥9 hours of sleep in a given day (28). Obese were considered participants with a BMI ≥ 30 kgs/m^2.

Data collection

All interviews were performed during PHC working hours by specially trained GPs and nurses. Data were initially recorded on paper and then transferred to the Clinic of Social and Family Medicine at the University of Crete where consistency checks and data entry and storage was performed.

Bioethics

The study was approved by the Bioethics Committee of the University Hospital of Heraklion (protocol number: 13541, 20.11.2010). All eligible persons or their caregivers were informed both verbally and through a patient/caregiver information sheet about the study by their GP and provided written consent if they agreed to participate. For patients unable to provide it, informed consent was provided by their caregivers.

Sample size estimation

The sample size estimation for this study was based on the objectives of the overall cohort study, which was to enroll a minimum of 250 persons meeting formal DSM IV criteria for dementia (12). Assuming a 8% (95% Confidence Interval [CI] from 7.1% to 9.0%) prevalence of any type of dementia among PHC visitors over 60 years of age a minimum sample size of 3,200 participants was estimated.

Statistical analysis

Demographic and other characteristics were summarized using descriptive statistics. Between-gender univariate comparisons were made using Pearson's chi-square test of independence (for categorical variables) and independent samples t-test (for continuous variables). All participants with complete data on age, gender and MMSE scores were included in the analysis and any missing data were handled by pairwise deletion. The level of significance was set to 5%, IBM SPSS 21 were used to conduct analyses.

Ethics approval and consent to participate

Ethical approval was granted by the Bioethics Committee of the University General Hospital of Heraklion (protocol number: 13541, 20.11.2010). Written informed consent was obtained from all patients and participant responses remained anonymous.

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Results

Participants

A total of 3,471 individuals were invited to participate of whom 271 (7.8%) declined participation. The main reported reasons for non-participation were lack of time for the interview (80%) and unwillingness to participate in research (20%). In most of the 3,200 conducted interviews (n=2,698, 84.0%) a caregiver/companion was present. Upon checking for duplicate entries and data consistency, 60 entries were removed from the database resulting in a total of 3,140 entries included in the analysis.

Socio-demographic characteristics of participants

Details regarding socio-demographic and other socio-economic characteristics of participants are presented in **Table 1**. The mean age of participants was 73.7 (SD = 7.8) years with male participants being significantly older than females (74.5 ± 7.9 vs 73.1 ± 7.6; p<0.0001). Most respondents were female (n=1,785, 56.8%). The majority (n=2,845, 90.6%) of individuals visited the selected PHC practices for prescription renewal. Regarding their marital status, most participants were married (n=2.217, 70.8%), followed by 764 (24.4%) that were widowed and 151 (4.8%) that were single/divorced. These rates were statistically significant between males and females, with more females reporting being widowed (n=627, 35.2%) compared to males (n=137, 10.1%); p<0.0001. As regards the level of education of participants, most had received primary education (n=2,304; 73.7%) and 570 (18.2%) had received secondary or greater. The reported level of education was found to differ significantly between males and females, with more males reporting having received secondary or greater compared to females (n=328; 24.3% vs n=242;13.6%; p<0.0001). Almost half participants (n=1,454; 46.6%) reported having one or two children, while a similar number reported having two or more (n=1,465; 46.9%). Most participants (n=1,924; 61.9%) reported living with one housemate, followed by 694 (22.3%) that reported living alone and 491 (15.8%) that reported living with 2 or more housemates. These rated were significantly different between gender with more females n=553 (31.2%) reporting living alone compared to males (n=141, 10.5%;p<0.0001). Finally, 1,958 (75.0%) of participants reported living in a house with three or more rooms.

Health habits, anthropometric characteristics and reported sleep problems of participants

Overall, 391 (12.5%) participants were current tobacco users and 1,368 (43.7%) reported current alcohol consumption. Smoking and alcohol consumption were more frequent among men, as shown in **Table 2**. About one quarter of participants reported being social alcohol consumers (n=832, 26.6%) with this rate being significantly higher in male participants compared to females (n=585, 44.2% vs n=170, 9.4%; p<0.0001). Similar results were reported for alcohol consumption on a daily basis where 840 (26.8%) reporting daily alcohol consumption (males n=607; 50.6; females n=170, 9.4%; p<0.0001). Average Body Mass Index (BMI) was higher among females than males [30.7 kg/m2 (SD = 5.4) vs. 28.8 kg/m2 (SD = 4.1), respectively; p<0.0001]. Nearly half of the participants (n=1,285; 49.4%) reported walking for at least 10 minutes daily and averaging 6.3 (SD = 1.8) hours of sleep per night. Sleep-related problems were reported by 2,056 (67.1%) participants and were more frequently reported in females than males (p<0.0001 across symptoms). Of the 3,140 participants, 2,594 (82.7%) were found to be fully independent in activities of daily living as measured by the Barthel index.

Frequency of most common chronic conditions

A detailed summary of reported chronic conditions is presented in **Table 3**. Most commonly reported chronic conditions included hypertension (n=2,140; 68.2%), dyslipidemia (n=1,427; 45.4%), type-II diabetes (n=786; 25.0%), benign prostate hyperplasia (n=335; 24.8% in males), osteoporosis (n=609; 19.4%) and GERD (n=557; 17.7%). Significant gender differences in the frequency of several chronic conditions were noted. As regards their encoding in ICD-10 categories, the most prevalent categories were endocrine, nutrition and metabolic diseases (n=2,400; 78.0%), diseases of the circulatory system (n=2,253; 71.8%), diseases of the musculoskeletal system and connective tissue (n=840; 26.8%) and diseases of the digestive system (n=832; 26.5%). The rates of ICD-10 categories by gender are depicted in **Figure 1**.

Frequency of chronic illnesses in ICD-10 categories

In **Table 4 (and Figure 1)**, the frequency of chronic conditions grouped in ICD-10 categories is being presented. The most prevalent categories included Endocrine, nutritional and metabolic diseases (n=2,400; 78.0%), followed by diseases of the circulatory system (n=2,253, 71.8%), diseases of the musculoskeletal system and

connective tissue (n=840; 26.8%), diseases of the digestive system (n=832; 26.5%), mental and behavioral disorders (n=523; 16.7%), diseases of the respiratory system (n=347; 11.1%) and diseases of the ear and mastoid process (n=317; 10.1%). Statistically significant differences in the above rates between the two genders were identified in the rates of Endocrine, nutritional and metabolic diseases (n=1,474; 78.0% in females; n=926; 71.1% in males; p<0.0001), in mental and behavioral disorders (n=370; 20.7% in females; n=153; 11.6% in males; p<0.0001), in diseases of the eye and adnexa (n=109; 6.0% in females; n=112; 8.5%; p=0.008), in the diseases of the ear and mastoid process (n=219; 12.1% in females; n=98; 7.4% in males; p<0.0001), in the diseases of the respiratory system (n=142; 7.8% in females, n=205; 15.5% in males; p<0.0001), in the diseases of the digestive system (n=510; 28.1% in females; n=322; 24.4%; p=0.020) and finally in the diseases of the musculoskeletal system and connective tissue (n=733; 40.4% in females; n=107; 8.1% in males; p<0.0001). The mean number of chronic illnesses is 3.3 (1.8) for the total population, 3.5 (1.9) in females and 3.1 (1.8) in males; p<0.0001. On the contrary the Charlson co-morbidity index is 4.3 (1.0) in males and 4.1 (0.9) in females; p<0.0001.

The burden of cognitive impairment (according to MMSE scores)

The average MMSE score was 26.0 (SD = 3.8) and was significantly higher in males than females (26.7 vs. 25.4; p<0.0001). Low MMSE scores were detected in 631 (20.2%) participants (459 (25.9%) females and 172 (12.8%) males; p<0.0001). As it can be seen, the extent of low MMSE scores increased with increasing age and it was 8.6% in participants aged 60-70 years (11.2% in females vs. 4.4% in males; p<0.00001) reaching to 44.2% in those aged 86 years or older (58.7% in females vs. 31.7% in males; p<0.0001) (**Figure 2**).

The relation between cognitive impairment and clinical phenotypes

In **Table 5** the adjusted odds ratios (OR) for probable cognitive impairment by chronic conditions in ICD-10 categories stratified by gender are being presented. It can be seen that presence of mental and behavioral disorders (F00-F99) was associated with increased odds for probable cognitive impairment in both genders (OR 1.71; p<0.0001 in females; OR 2.27; p<0.0001 in males). Furthermore, the presence of diseases of the nervous system (G00-G99) was associated with increased odds of probable cognitive impairment in both genders as well (OR 1.65; p=0.032 in

females; OR 1.82; p=0.046 in males). Injury, poisoning and certain other consequences of external causes (S00-T98) was associated with increased odds of cognitive impairment in male participants only (OR 2.99; p=0.005). On the other hand diseases of the musculoskeletal system and connective tissue (M00-M99) were associated with reduced odds for cognitive impairment in females (OR 0.77; p=0.042).

The relation between cognitive impairment and co-morbidity

In **Table 6** the adjusted odds ratios for cognitive impairment by the number of chronic conditions and the Charlson co-morbidity index, stratified by gender are being presented. It can be seen that the number of chronic conditions is not associated with increased odds for cognitive impairment in neither gender (p>0.05 for both). On the contrary the Charlson co-morbidity index was associated with increased odds of cognitive impairment in males (OR 1.31; p=0.004) and in females was close to statistical significance (OR 1.14; p=0.082).

Discussion

Summary of main findings

The present report documents a significant burden of cognitive impairment, as indicated by low MMSE scores, among persons older than 60 years visiting community-based primary care settings in the island of Crete, Greece. Specifically, as many as one in five persons across genders (and twice as many among women than among men) were identified as having cognitive impairment according to MMSE scores. The rates of cognitive impairment ranged from a low 8.6% in the individuals aged 60-70 years old to a high 58.7% in individuals aged 86 years or older. This study has also highlighted significant associations between cognitive impairment and specific ICD-10 categories of chronic conditions and multi-morbidity as measured by the Charlson co-morbidity index.

Discussion in the light of the literature

The prevalence of cognitive impairment in the present study was found to be around 20%. A recent door-to-door study conducted in a remote rural area of Crete, measured the prevalence of MCI at 15.3% in individuals 61 years or older, and that of the dementia at 2.0% and dementia with depression at 7.2% (29) based on the MMSE tool after the Mungas adjustment. Another recent population-based study in Larisa, central Greece estimated the overall prevalence of dementia at 5.0% in adults aged 65 years or above.

Despite the older age of males compared to female participants in our study, the burden of probable cognitive impairment was almost double among females. Certainly this finding could be partially attributed to the lower level of education of females compared to males that was identified in this study. In the literature, there is a well-documented relationship between the influence of the years of formal and the MMMSE scores (30). Nevertheless, this finding is consistent with other studies, which have also found the incidence and prevalence of dementia to be greater in females compared to males (31, 32). Indeed there is growing evidence that multiple cognitive abilities are more adversely affected by AD in women than in men (31).

In regard to the relationship between cognitive impairment and selected co-morbidities as measured by the ICD-10 categories, the present study identified

several associations that were common in both genders and some associations which were more pronounced either in males either in females. A positive association between mental and behavioral disorders was identified both in male and female participants. The most common mental and behavioral disorders in our study included depression and anxiety disorder. A recent systematic review with meta-analysis has calculated an odds ratio of 1.64 (95% CI from 1.48 to 1.81; based on 8 studies) between depression and dementia and an odds ratio of 2.05 (95% CI from 1.29 to 3.28) between anxiety disorder and dementia (33). These two figures are very close to our results. As regards depression, it is know that people with dementia of any type have a high incidence of major depression (34). The reported incidence of depression might be 30% in vascular dementia and AD (35) and 40%or higher in dementia associated with Parkinson's disease or Huntington's disease (36). Furthermore, the occurrence of a first major depressive episode in older adults is a risk-factor for developing dementia (34). Besides depression, anxiety is a common symptom in patients with dementia (37). Its prevalence estimates ranges from a low 8% to 71% for anxiety symptoms and from 5% to 21% for anxiety disorders (38, 39). In community setting, while the prevalence of anxiety disorder is 2-7% and around 10% in primary care elderly population (37). However, in patients with dementia, the rates of anxiety disorder rise between 38% and 72%(37).

As regards the diseases of the circulatory system, our study did not identify any significant associations. A recent systematic review stressed that cardiovascular risk (CV) factors showed contrasting directions of association between AD and vascular dementia, with most CV factors showing a negative association with AD and a positive association with vascular dementia (33).

Our study highlighted significant associations between diseases of the nervous system and cognitive impairment. Amongst the most frequent diseases of the nervous system in our study were stroke, Parkinson's disease and multiple sclerosis. In the literature stroke is a strong independent risk factor for all-cause dementia (40). A meta-analysis of 30 studies conducted in 2009 established that dementia prevalence in symptomatic stroke patients increased from 10% before first stroke to 20% soon after first stroke, and more than a third had dementia after recurrent stroke (41). More recently, a meta-analysis in 2013 established that stroke is a moderately strong risk factor for Alzheimer's disease (AD) (risk ratio (RR) = 1.59, 95% CI = 1.25 – 2.02) (42). Besides stroke, Parkinson's disease (PD) is one of the most common age-

related brain disorders, with cognitive decline being among the most common and important non-motor symptoms of PD (43). Studies have demonstrated a much higher cumulative risk of dementia in people with PD than in the general population, and systematic reviews showed that the point prevalence of dementia was 25–30%. Several long-term longitudinal studies have indicated that the majority of patients with PD will develop dementia if they survive for more than 10 years after diagnosis (44). As regards multiple sclerosis (MS) and the risk of dementia, there has been a lot of recent research into changes in cognition due to MS and it is now evident that such changes do occur and that they are more common than was previously thought. A recent retrospective population cohort in the UK (45) identified an increased odds of AD in a variety of autoimmune diseases including MS with an OR of 1.97 (95% CI from 1.88 to 2.07).

As regards the diseases of the musculoskeletal system and connective tissue, our results indicated a significant inverse association between them and cognitive impairment in female participants only. A recent systematic review and meta-analysis also identified such an inverse relationship between patients suffering from rheumatoid arthritis (33). Similar associations were identified in a retrospective record-linkage cohort in the UK (45), whether authors suggested the potential role of anti-inflammatory, a claim which has also been reported previously in the literature (46). In our study a positive association between injury, poisoning and certain other consequences of external causes and cognitive impairment in male participants was identified. The most common condition in that category that was assessed in our study was traumatic brain injury. Traumatic brain injury is perhaps the best established environmental risk factor for dementia (47). A meta-analysis of 15 case-control studies estimated that individuals who had had a head injury of sufficient severity to result in loss of consciousness were at approximately 50% increased risk of dementia compared with others (OR, 1.58; 95% CI, 1.21–2.06) (48).

Finally, our study indicated a significant association between multi-morbidity as expressed by the Charlson index and the presence of cognitive impairment. A recent population-based study showed that baseline chronic multi-morbidity was significantly associated to accelerated decline in daily functioning but not in cognition in dementia patients with this effect being present in persons suffering from dementia but not in non-demented persons. Due to the combination of lower functioning in ADLs at baseline and faster decline, dementia patients with multi-

imorbidity were about one to two years ahead of the decline of dementia patients without any co-morbidity (49). Another retrospective population-based study from Canada indicated that older age, multi-morbidity and dementia are all strongly correlated with adverse health outcomes as well as a proxy for loss of independent living. In that study the presence of dementia acted as a risk multiplier across all age and morbidity strata, leading to worse health outcomes, especially for the risks of death or discharge to a long-term care facility (50).

Strengths and limitations

To our knowledge, this is the first study assessing the burden of probable cognitive impairment in a primary care setting in Greece. The study sample size is relatively large and although it did not employ a door-to-door approach or a randomly selected sample, the use of consecutive patients can provide a relatively accurate description of the characteristics of PHC visitors within a well-defined area. In our study the MMSE was used for the detection of probable cognitive impairment. The MMSE is characterized by high sensitivity and relatively low specificity as a dementia screening tool (25), so to establish a clinical diagnosis in-depth neuropsychological examinations are needed. However, analysis of data from sub-population of the present sample defined by the corresponding DSM-IV criteria 303 of 344 (88%) participants with MMSE scores <24 were diagnosed as having either MCI or dementia (12). In addition to the above, in our study, we have excluded from recruitment patients visiting PHC facilities for an emergency, thus we have excluded delirium or other acute causes that may have an effect on cognition. As the cut-offs used in our study have previously been validated for detecting severe MCI or dementia (12) we are somewhat confident that cognitive impairment as judged by education-adjusted low MMSE in our population corresponds roughly to cases of mild cognitive impairment or dementia. Although specific associations between MMSE scores and specific chronic conditions expressed by the ICD-10 categories were identified, the cross-sectional nature of the study does not support causal links between specific types of chronic conditions and cognitive impairment. Additionally, it should be noted that the majority participants visited the selected PHC for prescription renewal, most likely because they suffered from a chronic condition. In this manner, our population may not include healthy older adults, as well as persons suffering from debilitating conditions that are typically treated in acute care settings and would not typically visit PHC units in Greece.

Implications

Implications in PHC services

This cross-sectional study revealed a significant burden of probable cognitive impairment according to MMSE scores in a primary care setting in Greece. Given the progressive nature of cognitive impairment in older persons, the results of this study emphasize the need for improved screening in PHC. In Greece a recent health care reform has been applied with the establishment of local PHC units in urban centres. These units have been established with an emphasis on disease prevention, given the lack of public PHC units in urban areas. In the context of the national plan for dementia (2015-2020) that has been prepared by the Ministry of Health, screening for cognitive impairment could be added among the tasks of the GPs and family physicians who serve these new units.

Implications in education

PHC practitioners may require additional training in terms of the need, screening procedures, and management practices related to cognitive impairment and associated co-morbidities. Specific conditions such mental and behavioral disorders or diseases of the nervous system as could be used as an alarm sign so to further investigate cognitive impairment. General practitioners should be trained in order to use the Mini-Mental-State-Examination tool as well as other tools such as the Test-Your-Memory (TYM) or the General Practitioner's Assessment of Cognition (GPCog) tool. Furthermore, General Practitioners and PHC professionals could also be trained in order to provide the family or care-takers of those suffering from cognitive impairment with the necessary information and skills regarding the increased health needs of these patients as well as stress-coping techniques and strategies.

Future research

This study has highlighted certain domains of epidemiological interest that could lead future research on the topic of cognitive impairment. Future research could target in identifying potential mechanisms and pathways to explain as why the burden of cognitive impairment is almost double in females compared to males. Another area of interest is to identify if there are any common mechanisms which affect neurologic and psychologic functioning of those affected by cognitive

impairment. Finally, in this study 3,140 individuals were recruited from many parts of the Heraklion, district. Future research could aim in identifying potential pocket-areas of a high-or low prevalence of cognitive impairment and potential environmental risk factors such as pesticides or other pollutants that contribute in the disease onset or progression.

Conclusions

This cross-sectional study provides new information about the prevalence of probable cognitive impairment in Greece in a primary care population aged 60 years and older. The findings of this study suggest that cognitive impairment deserves attention in primary care in a country that is currently undergoing reform in the governance and role of primary care services.

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List of abbreviations

AD - Alzheimer's Disease

BMI - Body Mass Index

BPH: Benign Prostate Hyperplasia

CHD: Coronary heart disease

CI - Confidence Interval

COPD: Chronic Obstructive Pulmonary Disease

CVD – Cardio Vascular Disease

DFA - Difficulty Falling Asleep

DMS - Difficulty Maintaining Sleep

EMA - Early Morning Awakening

EU - European Union

GERD: Gastroesophageal Reflux Disease

GP - General Practitioner

KM² – Square Kilometer

MCI - Mild Cognitive Impairment

MMSE - Mini Mental State Examination

MOR - Median Odds Ration

OR - Odds Ratio

PHC - Primary Health Care

SD - Standard Deviation

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Declarations

Parts of this study have been submitted for publication under the title "Cognitive impairment in a primary health care population: a cross-sectional study on the island of Crete, Greece" in the Journal "BMJ open" and are currently (May 2020) under revision.

Ethics approval and consent to participate

Ethical approval was granted by the Bioethics Committee of the University General Hospital of Heraklion (protocol number: 13541, 20.11.2010). Written informed consent was obtained from all patients and participant responses remained anonymous.

Funding

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Appendix 1. Tables and Figures

Table 1. Socio-demographic characteristics of participants and between-gender comparisons

	Overall (n=3,140)	**Females** (n=1,785)	**Males** (n=1,355)	**P-value**
Age, mean years (SD)	73.7 (7.8)	73.1 (7.6)	74.5 (7.9)	<0.0001
Marital status, n (%)				<0.0001
Single-divorced	151 (4.8%)	86 (4.8%)	65 (4.8%)	
Married	2,217 (70.8%)	1,067 (59.9%)	1,150 (85.1%)	
Widowed	764 (24.4%)	627 (35.2%)	137 (10.1%)	
Level of education, n (%)				<0.0001
None	251 (8.0%)	183 (10.3%)	68 (5.0%)	
Primary	2,304 (73.7%)	1,348 (76.0%)	956 (70.7%)	
Secondary or greater	570 (18.2%)	242 (13.6%)	328 (24.3%)	
Number of children, n (%)				0.001
None	204 (6.5%)	140 (7.9%)	64 (4.7%)	
One or two	1,454 (46.6%)	792 (44.6%)	662 (49.1%)	
≥3	1,465 (46.9%)	843 (47.5%)	622 (46.2%)	
Living situation, n (%)				<0.0001
Lives alone	694 (22.3%)	553 (31.2%)	141 (10.5%)	
One housemate	1,924 (61.9%)	973 (55.0%)	951 (71.0%)	
≥2 housemates	491 (15.8%)	244 (13.8%)	247 (18.5%)	
Number of rooms in home, n (%)				<0.0001
One or two	652 (25.0%)	411 (28.1%)	241 (21.0%)	
≥3 rooms	1,958 (75.0%)	1,050 (71.9%)	908 (79.0%)	

T**able 2.** Health habits, anthropometric characteristics and reported sleep problems of participants and between-gender comparisons

	Overall (n=3,140)	**Females** (n=1,785)	**Males** (n=1,355)	**P-value**
Smoking, n (%)				
Current smoker	391 (12.5%)	130 (7.3%)	261 (19.3%)	<0.0001
Ever smoker	1,164 (37.3%)	221 (12.4%)	943 (70.0%)	<0.0001
Alcohol consumption, n (%)				
Current consumer	1,368 (43.7%)	447 (25.1%)	921 (68.2%)	<0.0001
Ever consumer	1,634 (52.3%)	547 (30.7%)	1,087 (80.6%)	<0.0001
Social alcohol consumer, n (%)	832 (26.6%)	248 (13.6%)	585 (44.2%)	<0.0001
Daily alcohol consumer, n (%)	840 (26.8%)	170 (9.4%)	670 (50.6%)	<0.0001
BMI (Kg/m^2), mean (SD)	29.9 (5.0)	30.7 (5.4)	28.8 (4.1)	<0.0001
Walks daily for >10 min, n (%)	1,285 (49.4%)	590 (40.6%)	695 (60.5%)	<0.0001
Hours of sleep/night, mean (SD)	6.3 (1.8)	6.0 (1.8)	6.6 (1.8)	<0.0001
Prolonged sleep (≥9 hrs)	226 (7.3%)	100 (5.6%)	126 (9.7%)	<0.0001
Difficulty falling asleep, n (%)	1,371 (44.0%)	944 (53.1%)	427 (31.8%)	<0.0001
Difficulty maintaining sleep, n (%)	1,700 (54.3%)	1,060 (59.5%)	640 (47.3%)	<0.0001
Early awakening, n (%)	1,093 (35.1%)	733 (41.3%)	361 (26.9%)	<0.0001
Reporting at least one sleep complaint	2,056 (67.1%)	1,279 (73.0%)	777 (46.8%)	<0.0001
Fully independent in activities of daily living, n (%)	2,594 (82.7%)	1,427 (80.1%)	1,167 (86.3%)	<0.0001

Table 3. Frequency of most common chronic conditions for the entire population and by gender

n (%)	**Overall** (n=3,140)	**Females** (n=1,785)	**Males** (n=1,355)	**P-value**
Anemia	175 (5.6%)	109 (6.1%)	66 (4.9%)	0.133
Anxiety	128 (4.1%)	86 (4.8%)	42 (3.1%)	0.016
Arrhythmia	284 (9.0%)	169 (9.5%)	115 (8.5%)	0.340
Arthritis	348 (11.1%)	262 (14.7%)	86 (6.3%)	<0.0001
BPH		-	335 (24.8%)	-
CHD	522 (16.6%)	214 (12.0%)	308 (22.7%)	<0.0001
COPD	294 (9.4%)	105 (5.9%)	189 (14.0%)	<0.0001
Depression	387 (12.3%)	279 (15.6%)	108 (8.0%)	<0.0001
Dyslipidemia	1,427 (45.4%)	883 (49.5%)	544 (40.1%)	<0.0001
GERD	557 (17.7%)	334 (18.7%)	223 (16.5%)	0.100
Glaucoma	196 (6.2%)	96 (5.4%)	100 (7.4%)	0.022
Hypertension	2,140 (68.2%)	1,251 (70.1%)	889 (65.6%)	0.007
Hyperuricemia	258 (8.2%)	93 (5.2%)	165 (12.2%)	<0.0001
Hypothyroidism	291 (9.3%)	249 (13.9%)	42 (3.1%)	<0.0001
Type-II diabetes	786 (25.0%)	444 (24.9%)	342 (25.2%)	0.819
Osteoporosis	609 (19.4%)	583 (32.7%)	26 (1.9%)	<0.0001
Peptic Ulcer	216 (6.9%)	135 (7.6%)	81 (6.0%)	0.083
Vertigo	317 (10.1%)	218 (12.2%)	99 (7.3%)	<0.0001

Abbreviations; GERD: gastroesophageal reflux disease; CHD: Coronary heart disease; BPH: Benign Prostate Hyperplasia; COPD: Chronic Obstructive Pulmonary Disease

T**able 4 – Frequency of chronic illnesses by ICD-10 category, stratified by gender**

ICD-10 category (yes/no)	**Overall**	**Females** (n,%)	**Males** (n,%)	**P-value**
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism (D50-D89)	179 (5.7%)	112 (6.2%)	67 (5.1%)	0.188
Endocrine, nutritional and metabolic diseases (E00-E90)	2,400 (78.0%)	1,474 (83.1%)	926 (71.1%)	<0.0001
Mental and behavioral disorders (F00-F99)	523 (16.7%)	370 (20.4%)	153 (11.6%)	<0.0001
Diseases of the nervous system (G00-G99)	181 (5.8%)	103 (5.7%)	78 (5.9%)	0.789
Diseases of the eye and adnexa (H00-H59)	221 (7.0%)	109 (6.0%)	12 (8.5%)	0.008
Diseases of the ear and mastoid process (H60-H95)	317 (10.1%)	219 (12.1%)	98 (7.4%)	<0.0001
Diseases of the circulatory system (I00-I99)	2,253 (71.8%)	1,311 (72.2%)	942 (71.3%)	0.549
Diseases of the respiratory system (J00-J99)	347 (11.1%)	142 (7.8%)	205 (15.5%)	<0.0001
Diseases of the digestive system (K00-K93)	832 (26.5%)	510 (28.1%)	322 (24.4%)	0.020
Diseases of the musculoskeletal system and connective tissue (M00-M99)	840 (26.8%)	733 (40.4%)	107 (8.1%)	<0.0001
Injury, poisoning and certain other consequences of external causes (S00-T98)	108 (3.4%)	67 (3.7%)	41 (3.1%)	0.372
Number of chronic conditions Mean (SD)	3.3 (1.8)	3.5 (1.9)	3.1 (1.8)	<0.0001
Charlson comorbidity index score, mean (SD)	4.2 (1.0)	4.1 (0.9)	4.3 (1.0)	<0.0001

Table 5 – Logistic regression models predicting the odds of having low MMSE-scores by ICD-10 category, stratified by gender and adjusted for age (centered) and years of formal education.

ICD-10 category (yes/no)	**Females** (n=1,785) Adjusted OR	**95% CI (p-value)**	**Males** (n=1,355) Adjusted OR	**95% CI (p-value)**
Diseases of the blood and blood-forming organs and certain disorders involving the immune mechanism (D50-D89)	1.16 (0.73-1.84)	0.524	0.59 (0.25-1.38)	0.226
Endocrine, nutritional and metabolic diseases (E00-E90)	0.83 (0.61-1.14)	0.254	0.59 (0.62-1.31)	0.591
Mental and behavioral disorders (F00-F99)	1.71 (1.29-2.25)	<0.0001	2.27 (1.46-3.56)	<0.0001
Diseases of the nervous system (G00-G99)	1.65 (1.04-2.59)	0.032	1.82 (1.02-3.29)	0.046
Diseases of the eye and adnexa (H00-H59)	1.31 (0.83-2.08)	0.246	0.77 (0.43-1.38)	0.375
Diseases of the ear and mastoid process (H60-H95)	0.76 (0.54-1.09)	0.134	0.60 (0.32-1.16)	0.127
Diseases of the circulatory system (I00-I99)	0.93 (0.71-1.24)	0.628	0.88 (0.69-1.53)	0.883
Diseases of the respiratory system (J00-J99)	0.99 (0.64-1.53)	0.971	0.80 (0.51-1.26)	0.336
Diseases of the digestive system (K00-K93)	1.18 (0.91-1.53)	0.203	0.96 (0.69-1.49)	0.956
Diseases of the musculoskeletal system and connective tissue (M00-M99)	0.77 (0.61-0.99)	0.042	0.71 (0.39-1.31)	0.271
Injury, poisoning and certain other consequences of external causes (S00-T98)	1.25 (0.68-2.31)	0.479	2.99 (1.39-6.43)	0.005

T**able 6 – Logistic regression models predicting the odds of having low MMSE-scores by the number of chronic conditions and the Charlson co-morbidity index, stratified by gender and adjusted for age (centered) and years of formal education.**

ICD-10 category (yes/no)	**Females** (n=1,785) Adjusted OR	**95% CI (p-value)**	**Males** (n=1,355) Adjusted OR	**95% CI (p-value)**
Charlson comorbidity index score	1.14 (0.98-1.32)	0.082	1.31 (1.09-1.57)	0.004
Number of chronic conditions	0.99 (0.93-1.06)	0.872	1.02 (0.93-1.12)	0.729

Figures

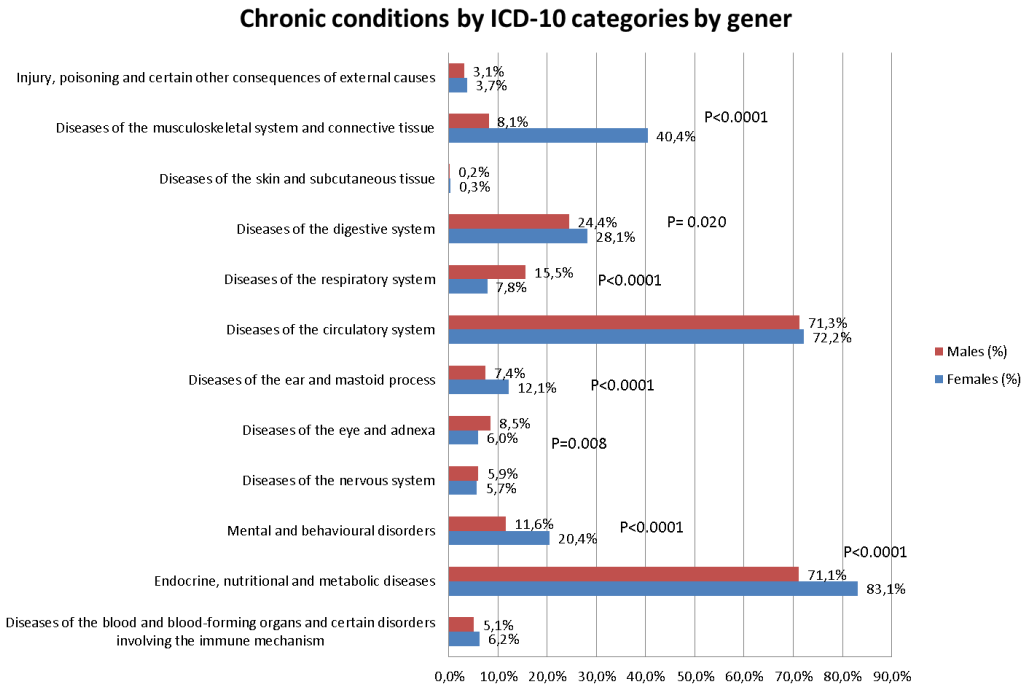


Figure 1. Chronic conditions presented in ICD-10 categories

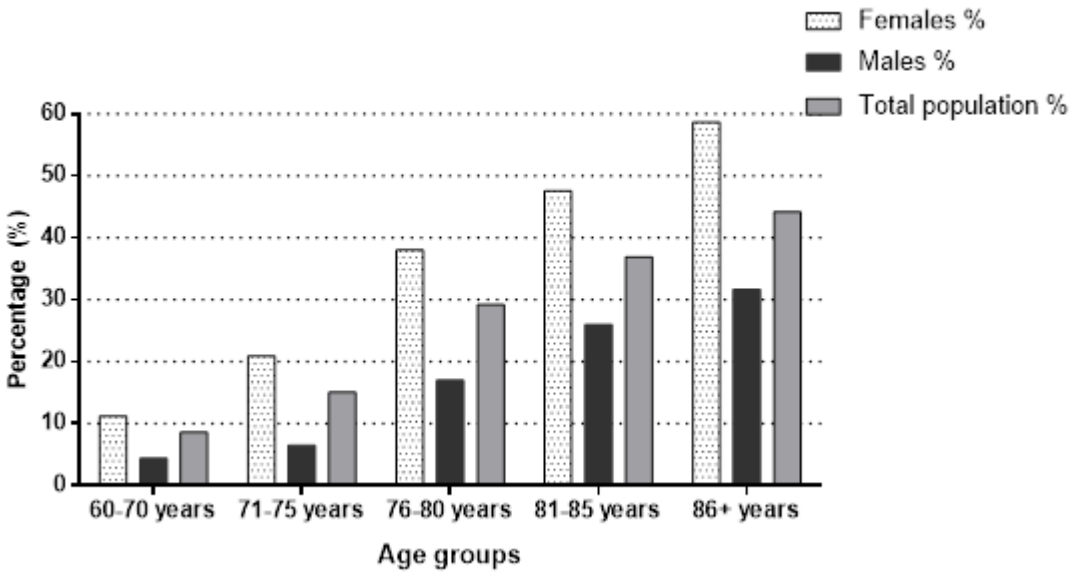


Figure 2. Rates of probable cognitive impairment according to MMSE scores by gender and age group

Appendix 2: Questionnaire of the study


ΘΑΛΗΣ -ΔΙΕΠΙΣΤΗΜΟΝΙΚΟ ΔΙΚΤΥΟ ΓΙΑ ΤΗ ΜΕΛΕΤΗ ΤΗΣ ΝΟΣΟΥ ALZHEIMER

Ερωτηματολόγιο για την ανίχνευση γνωστικών διαταραχών σε επισκέπτες υγείας επιλεγμένων μονάδων Πρωτοβάθμιας Φροντίδας Υγείας του Νομού Ηρακλείου με την υποστήριξη εργαλείων ανίχνευσης γνωστικής διαταραχής

1. Ονοματεπώνυμο συνεντευκτή: ……

[INTNAME]

2. Ονοματεπώνυμο επιβλέποντα Γενικού Ιατρού: ……

[PHYSNAME]

3. Αριθμός συνέντευξης: ……

[INTNUMBER]

4. Μονάδα Πρωτοβάθμιας Φροντίδας Υγείας: ……

[PHCUNIT]

5. Ημερομηνία συνέντευξης: ……../……../ 201… [INTDATE] **6. Ωρα: _____**

[INTTIME]

7. Λόγος επίσκεψης: [REASONVISIT]

1.Για συνταγογράφηση

□

2. Για κλινική Εξέταση για χρόνιο πρόβλημα

□

3. Για παραπομπή σε ιατρό άλλης ειδικότητας/σε νοσοκομείο

□

4. Για εμβολιασμό ή άλλο λόγο πρόληψης

□

5. Επείγον πρόβλημα υγείας

□

6. Άλλο (διευκρινίστε): _____
□

ΠΑΝΕΠΙΣΤΗΜΙΟ ΚΡΗΤΗΣ
ΤΜΗΜΑ ΙΑΤΡΙΚΗΣ
Κλινική Κοινωνικής και Οικογενειακής Ιατρικής

Ατομικό Φύλο Καταγραφής
ΘΑΛΗΣ -ΔΙΕΠΙΣΤΗΜΟΝΙΚΟ ΔΙΚΤΥΟ ΓΙΑ ΤΗ ΜΕΛΕΤΗ ΤΗΣ ΝΟΣΟΥ ALZHEIMER

Το ερωτηματολόγιο αυτό διαμορφώθηκε από την ομάδα της Κλινικής Κοινωνικής και Οικογενειακής Ιατρικής με τον Καθηγητή Γενικής Ιατρικής και Πρωτοβάθμιας Φροντίδας Υγείας κ. Χρήστο Λιονή και από τους Επιστημονικούς Συνεργάτες τον κ. Γεώργιο Ντάουκερ και τον κ. Αντώνιο Μπερτσιά. Συμπληρώθηκε και σχολιάστηκε από την Επίκουρη Καθηγήτρια κ. Ιωάννα Μοσχανδρέα.

1. ΔΕΔΟΜΕΝΑ ΑΣΘΕΝΟΥΣ

Α1. Ονοματεπώνυμο ασθενούς:
[NAME]

_____

Α2. Οι πληροφορίες παρέχονται:
[SOURCEINFO]

1. Από τον ίδιο τον ερωτηθέντα
2. Από συνοδό του ερωτηθέντα
3. Και από τους δύο (σημειώνετε ποιες ερωτήσεις)

Α3. Μητρώνυμο: _____

Α4. Πατρώνυμο: _____

Α5. Τόπος γεννήσεως: _____

Α6. Ασφάλιση: [INSURANCE]

1. ΟΓΑ □ 4. ΟΤΕ □ 7. ΤΣΜΕΔΕ □ 10. Άλλο: …….
2. ΙΚΑ □ 5. ΝΑΤ □ 8. ΤΥΔΕ □
3. ΤΕΒΕ □ 6. ΤΣΑΥ □ 9. Ανασφάλιστος □

Α7. ΑΜΚΑ ασθενούς:
[AMKA]

Α8. Ονοματεπώνυμο οικείου:
[NAMEREL]

_____

Α9. Τηλέφωνο <u>οικείου</u> για επικοινωνία:
[TELREL]

_____

Α10. Διεύθυνση (*πλήρη στοιχεία*):
[ADDRESS]

_____

_____

Α11. Τηλέφωνο επικοινωνίας <u>ασθενούς</u>:
(Κινητό) _____
[TELMOBILE]
(Σταθερό)_____

Α12. Ιδιότητα οικείου:
[RELAFFIL]

1. Σύζυγος □ 7. Άτομο από τη «βοήθεια στο σπίτι» □
2. Παιδί □ 8. Νοσηλευτικό προσωπικό του σπιτιού □
3. Αδελφός □

[TELHOME]	4. Φίλος □ 5. Άλλος συγγενής (διευκρινείστε)_____ □ 6. Άλλο (διευκρινείστε) _____ □
Α13. Χρόνο που βρίσκεται μαζί με τον συμμετέχοντα: 1. Πολλές ώρες κάθε μέρα □ 2. Πολλές ώρες κάθε εβδομάδα □ 3. Πολλές ώρες κάθε μήνα □ 4. Λίγες ώρες κάθε μήνα □	**Α14. Έτη που ο παρέχων τις πληροφορίες γνωρίζει τον συμμετέχοντα ασθενή** (αν < 1 χρόνο σημείωσε 1)**:** ..... έτη [INFOYEARS] **Α15. Ο παρέχων τις πληροφορίες ζει μαζί με τον συμμετέχοντα**: Όχι □ Ναι □ [LIVETOGETHER]

2. ΔΗΜΟΓΡΑΦΙΚΑ ΣΤΟΙΧΕΙΑ

Β1. Ημερομηνία γεννήσεως: [DATEBIRTH] | | | | | **1** | **9** | | | Ημέρα Μήνας Έτος	**Β2. Συζυγική κατάσταση:** [MARITALSTAT] 1. Ελεύθερος / η □ 2. Παντρεμένος / η □ / Πόσα έτη: _____ / Ηλικία που παντρεύτηκε: __ 3. Διαζευγμένος/η □ Αν ναι, πόσα χρόνια διαζευγμένος: _____ 4. Χήρος / α □ Αν ναι, πόσα χρόνια χηρείας: _____ 5. Αριθμός γάμων: ……
Β3. Υπηκοότητα: [NATIONAL] 1. Ελληνική □ 2. Άλλη _____ □ **Β4. Γλώσσα ομιλίας:** [LANGUAGE] 1. Ελληνική □ 2. Άλλη _____ □	**Β5. Αριθμός ατόμων με τα οποία συγκατοικεί:** _____ [LIVEWITH] **Β6. Σχέση με τα άτομα με τα οποία συγκατοικεί:** [RELTYPE] 1.Σύζυγος 2.Τέκνα 3.Αδερφός-ή 4. Εγγονός-ή 5. Άλλη (διευκρινίστε): _____
Β7. Εκπαίδευση ασθενούς: [EDUCATION] 0. Καμία □ 1. Πρωτοβάθμια □ _____ έτη σπουδών 2. Δευτεροβάθμια □ _____ έτη σπουδών 3. Τριτοβάθμια □ _____ έτη σπουδών 4. Μεταπτυχιακό □ _____ έτη σπουδών **Β8. Χρόνια εκπαίδευσης του πατέρα**: …… **Β9. Χρόνια εκπαίδευσης της μητέρας:**	**Β11. Επάγγελμα (Νυν):** [PROFFESSION] (μπορείτε να συμπληρώσετε άνω του ενός επαγγέλματα) 0. Συνταξιούχος / α □ 1. Οικιακά □ 2. Αγρότης □ 3. Κτηνοτρόφος □ 4. Εργάτης □ 5. Τεχνίτης □ 6. Ελεύθερος επαγγελματίας □ 9. Ιδιωτικός υπάλληλος □ 10. Εκπαιδευτικός □ 11. Διευθυντικός στέλεχος □ 12. Άνεργος □ 13. Άλλο:_____ □

……. **B10. Σειρά γέννησης του συμμετέχοντα:** …….	7. Δημόσιος υπάλληλος (γραφείο) □ 8. Δημόσιος υπάλληλος (εργάτης) □ **B12. Απασχόληση πατέρα:** …… **B13. Απασχόληση μητέρα:** ……
B14. Επάγγελμα <u>όταν</u> δούλευε: 1. Οικιακά □ 2. Αγρότης □ 3. Κτηνοτρόφος □ 4. Εργάτης □ 5. Τεχνίτης □ 6. Ελεύθερος επαγγελματίας □ 7. Δημόσιος υπάλληλος (γραφείο) □ 8. Δημόσιος υπάλληλος (εργάτης) □ 9. Ιδιωτικός υπάλληλος □ 10. Εκπαιδευτικός □ 11. Διευθυντικός στέλεχος □ 12. Άνεργος □ 13. Άλλο …… (Διευκρίνιση) □ **B15. 2η απασχόληση:** …… **B16. 3η απασχόληση:** …… **B17. 4η απασχόληση:** ……	**B18. Αριθμός παιδιών: _____** [NUMCHILD] **B19. Σε τι ηλικία απέκτησε τα παιδιά του:** a. 1ο παιδί ……ετών b. 2ο παιδί ……ετών c. 3ο παιδί ……ετών d. 4ο παιδί ……ετών e. 5ο παιδί ……ετών **B20. Ζουν κάποια παιδιά του στο εξωτερικό:** 0=όχι 1=ναι [CHILDABROAD] **B21. Αν ζουν τα παιδιά μακριά (σε άλλη πόλη)**: 0=όχι 1=ναι [CHILDOTHCITY] **B22. Πόσα παιδιά ζουν μακριά:** …… [NUMCHILDAWAY] **B23. Αριθμός δωματίων στο σπίτι (υπνοδωμάτια και σαλόνι):** …….

B24. Σε γυναίκες συμμετέχουσες: - **B24α.** Ηλικία έναρξης εμμήνου ρύσεως: ……..ετών / Δεν ξέρω / Δεν απαντώ - **B24b.** Ηλικία διακοπής εμμήνου ρύσεως: ……..ετών / Δεν ξέρω / Δεν απαντώ - **B24c.** Συνολικά έτη εμμήνου ρύσεως: ……..έτη / Δεν ξέρω / Δεν απαντώ - **B24d.** Κύκλος κανονικός: 0=όχι 1=ναι - **B24e**. Εγκυμοσύνες: …… - **B24f.** Αυτόματες αποβολές: …… / Δεν ξέρω / Δεν απαντώ - **B24g**. Προκλητές αποβολές: …… / Δεν ξέρω / Δεν απαντώ	**B25. Εγχειρήσεις:** [OPERATIONS] A. …… B. …… C. …… D. …… E. …… F. ……

3. ΣΥΝΗΘΕΙΕΣ ΥΓΕΙΑΣ

Κάπνισμα

C1. Είστε καπνιστής; ……. 0=όχι, 1=ναι [CURRSMOK]
C2. Καπνίζατε στο παρελθόν ……..0=όχι, 1=ναι [FORMERSMOK]
C3. Πόσα τσιγάρα καπνίζετε /καπνίζατε καθημερινά: …… [CIGSDAY]
C4. **Ηλικία** έναρξης καπνίσματος …… [SMOKESTART]
C5. **Ηλικία** διακοπής καπνίσματος …… [SMOKEQUIT]
C6. Έτη καπνίσματος …….. [SMOKEYEARS]

Αλκοόλ

C7. Πίνετε τώρα αλκοολούχα ποτά; 0=όχι 1=ναι [CURALC]
C8. Πίνατε στο παρελθόν; 0=όχι 1=ναι [ALCPAST]
C9. Πόσο συχνά πίνετε/πίνατε αλκοόλ (συχνότητα); [ALCFREQ]
5= δύο ή περισσότερες φορές την ημέρα
4=κάθε μέρα ή σχεδόν κάθε μέρα (5-6-7 φορές τη βδομάδα)
3=πολλές φορές τη βδομάδα (3-4 φορές τη βδομάδα)
2=πολλές φορές το μήνα (1-5 φορές το μήνα)
1=πολλές φορές το χρόνο (< 1φορά το μήνα)
0=μια φορά το χρόνο ή σπανιότερα

Ποιο από τα ακόλουθα ποτά πίνετε/πίνατε στο παρελθόν [ALCSPEC]
C10. Τσίπουρο (ένα ποτήρι 50γρ) 0=όχι, 1=ναι C10a. πόσα ποτήρια……. συχνότητα…… (Ημέρα / Εβδομάδα / Μήνα)
C11. Μπύρα (ένα ποτήρι 240γρ) 0=όχι, 1=ναι C11a. πόσα ποτήρια…… συχνότητα…… (Ημέρα / Εβδομάδα / Μήνα)
C12. Κρασί (ένα ποτήρι 100γρ) 0=όχι, 1=ναι C12a. πόσα ποτήρια…… συχνότητα…… (Ημέρα / Εβδομάδα / Μήνα)
C13. Ουίσκι (ένα ποτήρι 50γρ) 0=όχι, 1=ναι C13a. πόσα ποτήρια…… συχνότητα…… (Ημέρα / Εβδομάδα / Μήνα)

C14. Πίνετε/πίνατε ποτέ το πρωί; ……0=όχι, 1=ναι [ALCMORN]
C15. Θα θεωρούσατε τον εαυτό σας κοινωνικό πότη: 0=όχι 1=ναι
[SOCIALDRINK]
C16. Οι άλλοι σας θεωρούσαν κοινωνικό πότη: 0=όχι 1=ναι
[OTHERSOCDRINK]
C17. Συνήθως πίνατε μόνος σας ή με φίλους: 0=μόνος 1=με φίλους 2=και τα δύο
[DRINKALONE]

C18a. Πόσες ώρες κοιμάστε το βράδυ; [HOURSLEEP] |_____| 88. Δεν ξέρω |_____| 99. Δεν απαντώ |_____|
C18b. Έχετε δυσκολία να αποκοιμηθείτε: 0=όχι, 1=ναι
[FALLASLEEP]
C18c. Έχετε δυσκολία να παραμείνετε κοιμισμένος (ή να έχετε συνεχή ύπνο): 0=όχι, 1=ναι
[STAYASLEEP]
C18d. Το πρωί ξυπνάτε νωρίτερα από ότι θα επιθυμούσατε: 0=όχι, 1=ναι
[EARLYWAKE]

C19. Πώς κρίνει ο ασθενής την κατάσταση της υγείας του σε σύγκριση με συνομήλικους γνωστούς του; [HEALTHSTAT]

|___|___|___|___|___|___|___|___|___|___|___|
0 1 2 3 4 5 6 7 8 9 10
(Πολύ κακή) (Μέτρια) (Άριστη)

ΑΣΚΗΣΗ

C20. Κατά τις τελευταίες 7 ημέρες, πόσες ημέρες περπατήσατε για περισσότερο από 10 συνεχόμενα λεπτά;
[WALKDAYS]

|_____|ημέρες 88. Δεν ξέρω |_____| 99. Δεν απαντώ |_____|

C21. Τις ημέρες που περπατήσατε, για περισσότερο από 10 συνεχόμενα λεπτά, πόσο χρόνο περάσατε περπατώντας; [WALKTIME]

|_____| λεπτά 88. Δεν ξέρω |_____| 99. Δεν απαντώ |_____|

4. ΙΣΤΟΡΙΚΟ ΥΓΕΙΑΣ	**ΝΑΙ**	**ΟΧΙ**	**Άγνωστο**
D1. Αρτηριακή Υπέρταση	**1**	**0**	**99**
D2. Σακχαρώδης Διαβήτης	**1**	**0**	**99**
D3. Στεφανιαία Νόσος	**1**	**0**	**99**
D3a. Έμφραγμα μυοκαρδίου	**1**	**0**	**99**
D4. Συμφορητική καρδιακή ανεπάρκεια	**1**	**0**	**99**
D5. Αρρυθμία	**1**	**0**	**99**
D6. Άλλη καρδιακή νόσο *(αν ναι, διευκρινίστε: _____)*	**1**	**0**	**99**
D7. Δυσλιπιδαιμία	**1**	**0**	**99**
D8. Βρογχικό άσθμα	**1**	**0**	**99**
D9. ΧΑΠ ή άλλη πνευμονική νόσο	**1**	**0**	**99**
D10. Υπερθυρεοειδισμός	**1**	**0**	**99**
D11. Υποθυρεοειδισμός	**1**	**0**	**99**
D12. Νόσος του ήπατος	**1**	**0**	**99**
D13. Νεφρική ανεπάρκεια	**1**	**0**	**99**
D14. Πεπτικό έλκος	**1**	**0**	**99**
D15. Περιφερική αγγειακή νόσος	**1**	**0**	**99**
D16. Κακοήθεια	**1**	**0**	**99**
D17. Αρθρίτιδα	**1**	**0**	**99**
D18. Οστεοπόρωση	**1**	**0**	**99**
D19. Σύνδρομο ευερέθιστου εντέρου	**1**	**0**	**99**
D20. Κατάθλιψη	**1**	**0**	**99**
D21. Αγχώδης Διαταραχή	**1**	**0**	**99**
D22. Σπασμούς / Επιληψία	**1**	**0**	**99**
D23. Νόσος Parkinson	**1**	**0**	**99**
D24. Σκλήρυνση κατά πλάκας	**1**	**0**	**99**
D25. Καλοήθης υπερπλασία προστάτη	**1**	**0**	**99**
D26. Αναιμία	**1**	**0**	**99**
D27. Άλλες αιματολογικές διαταραχές *(αν ναι, διευκρινίστε:)*	**1**	**0**	**99**
D28. Χρήση απαγορευμένων ουσιών	**1**	**0**	**99**
D29. Σύφιλη	**1**	**0**	**99**
D30. Νόσος Huntigton	**1**	**0**	**99**
D31. Έλλειψη Β-12	**1**	**0**	**99**
D32. Υδροκέφαλος φυσιολογικής πίεσης	**1**	**0**	**99**
D33. Σύνδρομο Down	**1**	**0**	**99**
D34. Κρανιοεγκεφαλική κάκωση:	**1**	**0**	**99**
• D34a. Με απώλεια συνείδησης	**1**	**0**	**99**
• D34b. Διάρκεια απώλειας συνείδησης (0=< 5 λεπτά / 1= >5	**1**	**0**	**99**
D35. Άλλη παθολογική κατάσταση	**1**	**0**	**99**
D36. Άλλη παθολογική κατάσταση	**1**	**0**	**99**
D37. Άλλη παθολογική κατάσταση	**1**	**0**	**99**
5. Δείκτης ανεξαρτησίας του Katz στις δραστηριότητες καθημερινής ζωής*			

Δραστηριότητες Βαθμοί (1 ή 0)	**Ανεξαρτησία (1 ΒΑΘΜΟΣ)** ΚΑΜΙΑ επίβλεψη, καθοδήγηση ή προσωπική βοήθεια	**Εξάρτηση (0 ΒΑΘΜΟΙ)** ΜΕ επίβλεψη, καθοδήγηση, προσωπική βοήθεια ή ολική φροντίδα
Ε1. Μπάνιο / Βαθμός: ____	Κάνει μπάνιο εντελώς μόνος του / μόνη της ή χρειάζεται βοήθεια για να κάνει μπάνιο μόνο κάποιο μέρος /η του σώματος, όπως είναι η πλάτη, η γεννητική περιοχή ή τα ανάπηρα άκρα (χέρια ή/και πόδια).	Χρειάζεται βοήθεια για να κάνει μπάνιο περισσότερα από ένα μέρος του σώματος του/της, για να μπει ή να βγει από τη μπανιέρα ή το ντους. Απαιτεί ολικό μπάνιο.
Ε2. Ντύσιμο / Βαθμός: ____	Παίρνει ρούχα από ντουλάπια και συρτάρια και ντύνεται με ρούχα και πανωφόρια πλήρως με κούμπωμα κουμπιών ή φερμουάρ. Ίσως έχει βοήθεια για να δέσει τα παπούτσια του/της.	Χρειάζεται βοήθεια για να ντυθεί μόνος/η ή χρειάζεται βοήθεια για να ντυθεί εντελώς.
Ε3. Χρήση τουαλέτας / Βαθμός: ____	Πηγαίνει στην τουαλέτα, κάθεται και σηκώνεται, τακτοποιεί τα ρούχα του/της, καθαρίζει την γεννητική περιοχή χωρίς βοήθεια.	Χρειάζεται βοήθεια για να μετακινηθεί μέχρι την τουαλέτα, για να αυτοκαθαριστεί ή χρησιμοποιεί πάπια ή κορμό.
Ε4. Μετακίνηση/Βαθμός: ____	Μετακινείται στο και από το κρεβάτι του/της ή την καρέκλα χωρίς βοήθεια. Είναι αποδεκτά μηχανικά υποστηρίγματα μετακίνησης.	Χρειάζεται βοήθεια για να μετακινηθεί από το κρεβάτι του/της στην καρέκλα ή απαιτεί μια πλήρη μετακίνηση.
Ε5. Εγκράτεια / Βαθμός: ____	Ασκεί πλήρη αυτοέλεγχο ούρησης και εγκόπρισης.	Έχει μερική ή ολική ακράτεια ούρησης κύστης (ούρων) ή εντέρου (κοπράνων).
Ε6. Τάϊσμα / Βαθμός: ____	Φέρνει φαγητό από το πιάτο στο στόμα του/της χωρίς βοήθεια. Η προετοιμασία του φαγητού μπορεί να γίνει από άλλο πρόσωπο.	Χρειάζεται μερική ή ολική βοήθεια για να φάει ή απαιτεί παρεντερική διατροφή.

*Katz S, Down TD, Cash HR, et al. (1970) Progress in development of the index of ADL. Gerontologist 10: 20-30. Μετάφραση από Ελίζα Ιατράκη στο πλαίσιο της μεταπτυχιακής εργασίας της στο Τμήμα Ιατρικής, Πανεπιστήμιο Κρήτης (Επιβλέπων κ. Χρήστος Λιονής). Χρησιμοποιείται μετά από άδεια.

Δείκτης BARTHEL (BARTHEL INDEX)**

	Με	**Ανεξάρτητος**
Σίτιση (εάν η τροφή χρειάζεται να τεμαχιστεί = βοήθεια)	5	10
Κινείται από το αναπηρικό καρότσι στο κρεβάτι και επιστρέφει (περιλαμβάνει το κάθισμα στο κρεβάτι)	5-10	15
Ατομική υγιεινή (πλένει πρόσωπο, χτενίζει μαλλιά, ξυρίζεται, καθαρίζει δόντια)	0	5
Ανεβαίνοντας και κατεβαίνοντας από την τουαλέτα (χειρίζεται τα ρούχα, σκουπίζεται τραβάει το καζανάκι)	5	10
Λουτρό μόνος του	0	5
Περπάτημα σε ισόπεδη επιφάνεια (ή εάν δεν είναι ικανός να περπατήσει, προωθεί το αναπηρικό καρότσι)	0	5
Ανεβαίνει και κατεβαίνει σκαλοπάτια	5	10
Ντύσιμο (περιλαμβάνει δέσιμο παπουτσιών, στερέωση προσδέσεων)	5	10
Ελέγχει έντερα	5	10
Ελέγχει κύστη	5	10

** Mahoney FI, Barthel DW. Functional Evaluation: The Barthel Index. MD State Medical J 1965Q 149 (2): 61-65 Μετάφραση από κ. Μ. Σγάντζο και κ. Χρ. Λιονή. Χρησιμοποιείται μετά από άδεια

6. Τρέχουσα Φαρμακευτική αγωγή (Εμπορική ονομασία)	**Δραστική ουσία**	**Δοσολογία**	**Ένδειξη Νόσημα**
F1. [CURDRUQ1]			
F2. [CURDRUQ2]			
F3. [CURDRUQ3]			

F4. [CURDRUQ4]			
F5. [CURDRUQ5]			
F6. [CURDRUQ6]			
F8. [CURDRUQ8]			
F9. [CURDRUQ9]			
F10. [CURDRUQ10]			
F11. [CURDRUQ11]			
F12. [CURDRUQ12]			

7. ΒΙΟΜΕΤΡΙΚΟΙ ΔΕΙΚΤΕΣ

G1. **ΒΑΡΟΣ (Kg)** [WEIGHT]	G2. **ΥΨΟΣ (m)**	G3. **ΠΕΡΙΦΕΡΕΙΑ ΜΕΣΗΣ (cm)** [WAIST]

8. Mini Mental State Examination (MMSE)***

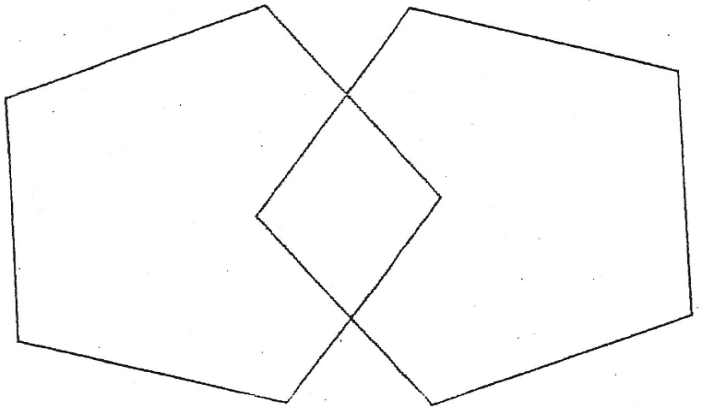
	Σωστό	**Λάθος**
MMSE1. Τι μέρα της εβδομάδας έχουμε;		
MMSE2. Ποια είναι η ημερομηνία σήμερα;		
MMSE3. Τι μήνα έχουμε;		
MMSE4. Τι έτος;		
MMSE5. Ποια είναι η εποχή μας;		
MMSE6. Σε ποια χώρα ζούμε;		
MMSE7. Ποιο είναι το όνομα αυτής της πόλης;		
MMSE8. Πώς λέγονται οι δυο πιο σημαντικοί δρόμοι γύρω από το σπίτι σας;		
MMSE9. Σε ποιόν όροφο βρισκόμαστε τώρα;		
MMSE10. Πώς λέγεται αυτό το μέρος;		
MMSE11. Τι είναι αυτό; (δείχνουμε το μολύβι)		
MMSE12. Πώς λέγεται αυτό; (δείχνουμε το ρολόι)		
MMSE13. Θα σας πω μια φράση και θα ήθελα να την επαναλάβετε μετά από μένα: *«της πόλης, της πάλης, της όλης»*		
MMSE 14. Ονομάστε τα παρακάτω ακόλουθα τρία αντικείμενα με παύση: - ***Μήλο***		
MMSE 15. - ***Τραπέζι***		
MMSE 16. - ***Δραχμή***		
MMSE17. Αφαιρέστε 7 από τα 100. Ξανα-αφαιρέστε 7 από τον αριθμό που βρήκατε. Συνεχίστε να αφαιρείτε 7, μέχρι να πω να σταματήσετε:		
MMSE18. - ***86***		
MMSE19. - ***79***		
MMSE20. - ***72***		
MMSE21. - ***65***		

MMSE22. Ποια ήταν τα τρία αντικείμενα που σας ζήτησα να θυμάστε πριν λίγο;		
MMSE23. - ***Τραπέζι***		
MMSE24. - ***Δρασκή***		
MMSE 25. '' ΚΛΕΙΣΤΕ ΤΑ ΜΑΤΙΑ ΣΑΣ ''		
MMSE 26. Αντιγράψτε αυτό το σχέδιο (πεντάγωνα)		
MMSE27. Γράψτε μια δική σας πλήρη πρόταση σε αυτό το χαρτί		
MMSE28. Θα σας δώσω ένα φύλλο χαρτί. Θέλω να το πάρετε με το δεξί σας χέρι - ***Δεξί χέρι***		
MMSE29. Να το διπλώσετε στα δύο - ***Δίπλωμα***		
MMSE30. Και να το αφήσετε μετά πάνω στο τραπέζι - ***Πάνω στο τραπέζι***		
ΣΥΝΟΛΟ ΒΑΘΜΟΛΟΓΙΑΣ MMSE [MMSESCORE]	**/ 30**	

Πρόταση ασθενούς:

ΠΑΡΑΡΤΗΜΑΤΑ – Mini Mental State Examination (MMSE)

ΚΛΕΙΣΤΕ ΤΑ ΜΑΤΙΑ ΣΑΣ



****Η Ελληνική έκδοση του ερωτηματολογίου Mini Mental state Examination βασίστηκε από τη δημοσίευση: Φουντουλάκης Κ,Τσολάκη Μ και συν. Mini-Mental State Examination (MMSE): Στάθμισή του στον ελληνικό πληθυσμό σε ηλικιωμένους ασθενείς με άνοια. Εγκέφαλος 1994; 31: 93-102.*

9. GPCOG Δοκιμασία Διαλογής (Εξέταση ασθενούς)****

	Σωστό	**Λάθος**
*«Θα σας δώσω ένα όνομα και μία διεύθυνση. Αφού τα πω, θέλω να τα επαναλάβετε. Να θυμόσαστε αυτό το όνομα και τη διεύθυνση γιατί θα σας ζητήσω να μου τα πείτε ξανά σε μερικά λεπτά. Ιωάννης Παπαδάκης, Καστρινάκη 42, Ηράκλειο.» (Επιτρέψτε το μέγιστο **4 προσπάθειες**).*	*Δεν Βαθμολογείται*	*Δεν Βαθμολογείται*
GPCOG1. *Τι ημερομηνία έχουμε;* (ακριβής)		
Σχεδιασμός Ρολογιού – χρησιμοποιήστε κενή σελίδα **GPCOG2**. *Σας παρακαλούμε σχεδιάστε όλους τους αριθμούς που υποδεικνύουν τις ώρες ενός ρολογιού* (απαιτούνται σωστές αποστάσεις μεταξύ τους)		
GPCOG3. *Σας παρακαλούμε σχεδιάστε τους δείκτες έτσι ώστε να δείχνουν έντεκα και δέκα* (11.10)		

GPCOG4. *Μπορείτε να μου πείτε κάποια πρόσφατη είδηση;* (Πρόσφατη = την προηγούμενη εβδομάδα. Εάν δοθεί μία γενική απάντηση, όπως «πόλεμος», «πολλή βροχή» ζητήστε λεπτομέρειες. Μόνο συγκεκριμένη απάντηση βαθμολογείται)		
Ποιο ήταν το όνομα και η διεύθυνση που σας ζήτησα να θυμόσαστε;		
GPCOG6. *Επώνυμο (Παπαδάκης)*		
GPCOG7. *Διεύθυνση (Καστρινάκη)*		
GPCOG8. *Αριθμός διεύθυνσης (42)*		
GPCOG9. *Πόλη (Ηράκλειο)*		
ΣΥΝΟΛΟ ΒΑΘΜΟΛΟΓΙΑΣ GPCOG [GPCOGSCORE]	**/ 9**	

****Brodaty et al, *JAGS* 2002; 50:530-534. Υπό στάθμιση από ομάδα του Πανεπιστημίου Κρήτης. *Μετάφραση από Χρήστο Λιονή και Ελίζα Ιατράκη. Κλινική Κοινωνικής και Οικογενειακής Ιατρικής, Τμήμα Ιατρικής, Πανεπιστήμιο Κρήτης. Χρησιμοποιείται μετά από άδεια.*

Σχεδιασμός ρολογιού

ΕΛΕΓΞΕ ΤΗ ΜΝΗΜΗ ΣΟΥ

Η Δοκιμασία ΤΥΜ ****

Παρακαλώ γράψτε το πλήρες όνομά σας ……
του…… Η μέρα σήμερα είναι ……
Η σημερινή ημερομηνία είναι: ……. του …… (μηνός) 20……
Πόσο χρονών είστε; …….. χρονών
Ποια μέρα έχετε την ονομαστική σας γιορτή; …….. / …… (μήνας)

1

Παρακαλώ αντιγράψτε την ακόλουθη πρόταση:
Οι καλοί πολίτες πάντα φορούν γερά παπούτσια
……
Παρακαλώ διαβάσετε ξανά την πρόταση και να προσπαθήσετε να την θυμάστε

2

Ποιος είναι ο πρωθυπουργός της Ελλάδας; …… ……

Ποιο έτος ξεκίνησε ο δεύτερος παγκόσμιος πόλεμος; ……

3

Πράξεις
20 – 4 = ……..
16 + 17 = ……..
8 x 6 = ……..
4 + 15 - 17 = ……..

4

Παρακαλώ γράψτε κατά σειρά τέσσερα ζώα που αρχίζουν από «Κ» π.χ. Καρχαρίας
1 Κ……
2 Κ……
3 Κ……
4 Κ……

4

Σε τί μοιάζει το κρεμμύδι με την πατάτα; ……

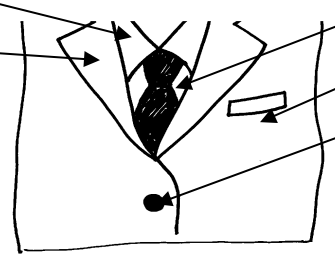
Σε τί μοιάζει το λιοντάρι με το λύκο; ……

4

Θυμηθείτε: Οι καλοί πολίτες πάντα φορούν γερά παπούτσια

Παρα

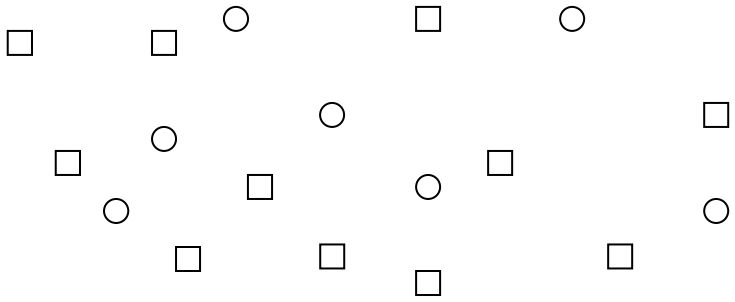
1……
2……



3……
4……
5……

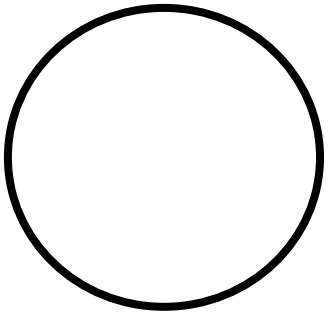
5

Παρακαλώ ενώστε τους κύκλους για να σχηματιστεί ένα γράμμα (αγνοήστε τα τετράγωνα)



3

Παρακαλώ σχεδιάστε ένα ρολόι, τοποθετήστε τους αριθμούς από 1 έως 12 και τους δείκτες να δείχνουν 9:20



4

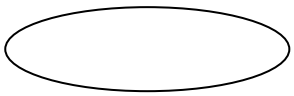
Παρακαλώ, χωρίς να γυρίσετε σελίδα, γράψτε την πρόταση που αντιγράψατε νωρίτερα:

6

……

5

ΓΙΑ ΤΟΝ ΣΥΝΕΝΤΕΥΚΤΗ ΤΗΣ ΔΟΚΙΜΑΣΙΑΣ TYM:
ΒΟΗΘΕΙΑ ΠΟΥ ΔΟΘΗΚΕ: ΚΑΜΙΑ/ΕΠΟΥΣΙΩΔΗΣ/ΜΙΚΡΗ/ΜΕΤΡΙΑ/ΜΕΓΙΣΤΗ
ΣΗΜΕΙΩΣΤΕ ΣΤΟ ΚΟΥΤΙ ΕΑΝ ΓΡΑΦΤΗΚΑΝ ΟΙ ΑΠΑΝΤΗΣΕΙΣ ΓΙΑ ΤΟΝ ΑΣΘΕΝΗ



****Brown J, Pengas G, Dawson K, et al. Self administered cognitive screening test (TYM) for detection of Alzheimer's disease: cross sectional study. BMJ. 2009 Μετάφραση από ομάδα Πανεπιστημίου Κρήτης σε συνεργασία με την Καθηγήτρια κ. Χ. Τζιράκη. Υπό στάθμιση. Χρησιμοποιείται μετά από άδεια.