Research article

Association of cognitive function of non-demented elderly primary care attendees with physical, mental, and sociodemographic factors

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ABSTRACT

Preservation of a population's cognitive functions is a matter of increased concern for all healthcare systems. The detection of factors that are associated with cognitive functions is a matter of increased interest to both the treatment of vulnerable individuals and the implementation of strategies to delay age-related cognitive decline. This study aimed to highlight sociodemographic, physical, and mental health factors associated with the cognitive function in non-demented elderly primary health care attendees. The sample consisted of 362 primary health care attendees aged 60 years or above. A questionnaire regarding sociodemographic and physical health history, along with a battery of psychometric instruments consisting of the Test Your Memory (TYM) test, Geriatric Depression Scale-Short Form (GDS-15), Short Anxiety Screening Test (SAST), and World Health Organization-Five Well-Being Index (WHO-5), were given to all participants. Participants who scored below 39/40 in the TYM, which is the cut-off point for dementia screening in the version of the test we used, were excluded from further assessment. For the rest of the participants, 267 in total, their TYM scores were significantly and negatively correlated with age and SAST scores. Participants with lung and vascular health history problems scored lower in the TYM, as did those with poor education, who lived alone, and who lived in Alexandroupolis. Finally, healthy participants scored higher than individuals with at least one medical condition. Linear multiple regression analysis revealed a model (adjusted R^2=25.80, F=10.11, p<0.001) with three factors (age (beta=−0.32), lung problems (beta=−0.23), and vascular factors (beta=−0.20) that could significantly predict 25.80% of the variance in TYM scores. Preservation of physical health, especially lung and vascular health, along with anxiety alleviation help to counterbalance the negative effect of aging on cognitive function in non-demented elderly primary care attendees.

KEYWORDS: Primary health care, cognitive decline, elderly, lung problems, vascular factors.

Introduction

Aging is a major challenge of our time. It is estimated that those aged over 60 years have exceeded 25% of the total population in all member states of the EU.[1] Greece faces a huge problem, since it is among the countries in Europe with the highest life expectancy at birth and simultaneously the lowest birth rate.[2]

Active aging is one of the main strategies in Europe to counter the demographic challenge.[3] Preservation of cognitive function constitutes an important factor in this ef-

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fort, as it relates to the elderly's successful performance in daily activities and their ability to live independently and contribute to society for as long as possible.

Cognitive function is worse in the elderly since age is the most significant risk factor for cognitive decline. This decline is not a homogenous phenomenon, since factors other than aging are also involved. Such factors include individuals' mental and physical health, stress levels, and various socioeconomic variables, such as education, financial status, and social contacts.[4] Although most of these factors are known to be associated with cognitive decline, there is a sense of lesser importance regarding these factors in elderly individuals with normal cognitive function. This is despite the fact that even a relatively small decline in cognitive function can lead to reduced activities for the elderly, such as driving or working. On the other hand, changes in lifestyle can help preserve cognitive capacity.[5]

Primary healthcare is the most appropriate setting for the assessment and protection of cognitive function. Primary health care professionals receive many complaints regarding memory issues, and they are the only ones that have a holistic approach regarding the overall physical and mental health of the patients. General practitioners need to have concrete and solid knowledge of the most important factors associated with attendees' cognitive function.

This study aimed to highlight sociodemographic, physical, and mental health factors associated with the cognitive function of non-demented elderly primary health care attendees.

Material and Method

Sample

The study took place in two middle-sized Greek municipalities (with populations of between 50,000 and 100,000 inhabitants), Alexandroupolis and Karditsa, which are 520 km apart and situated in the northeastern and central mainland of Greece, respectively. All participants were primary healthcare users and were recruited through simple random sampling. Over 10 months, researchers visited elderly care centres, as well as primary health care clinics of the above municipalities weekly, on different days of the week. Every service user who was 60 years old or above was asked to participate in the study. All participants provided written informed consent and formed the initial sample of the study. Of them, those who scored below 39/40 in the Test Your Memory (TYM) test, which is the cutoff point for dementia screening in the version of the test we used, were excluded from further assessment. The remaining participants were des-

ignated as non-demented participants and formed the final sample of the study.

The Democritus University of Thrace Ethics Committee granted permission for the study. The study was conducted according to the standards of the Declaration of Helsinki (1995) as revised in Edinburgh (2000).

Instruments

The participants of the study answered or filled in the following questionnaires.

1. A detailed ad-hoc questionnaire on:

a. Sociodemographic data included age (in years), sex (male/female), education (literate/poorly educated or illiterate), type of house (owned or rented), living with someone else in the same household or living alone, and municipality of residence (Alexandroupolis/ Karditsa).

b. Physical health history data regarding possible vascular risk factors (e.g. hypertension, diabetes), possible lung problems, smoking habits, possible neurological problems (e.g. stroke, brain damage), possible kidney issues, possible endocrine problems, other health issues or comorbidities. These factors were assessed in a binary manner (present/absent or yes/no).

2. Test Your Memory (TYM) test

This is a self-administered questionnaire that is sensitive to mild Alzheimer's disease, designed to assess cognitive function thoroughly, in minimal time by a non-specialist. It consists of a series of 10 cognitive tasks on a double-sided sheet of paper with spaces for the patient to fill in. It also includes an eleventh task, scored negatively, on how much help was needed for the participant to complete the test. The 10 cognitive tasks were orientation, ability to copy a sentence, semantic knowledge, calculation, verbal fluency, similarities, naming, visuospatial abilities (two tasks), and recall of a copied sentence. The TYM has a total maximum score of 50 points. It has a more balanced overall score regarding cognitive function than the Mini-Mental State Examination (MMSE) test.[5] The version of the instrument used in the present study was translated and standardised by our team in the same population in advance, as a culturally adapted instrument for the specific target population. It has a Cronbach's alpha of 0.74, inter-rater reliability of 0.98, and at the cutoff point of 39/40, a sensitivity of 71% and a specificity of 70% for diagnosing dementia.[6,7]

3. Geriatric Depression Scale-Short Form (GDS-15)

The GDS is one of the most commonly used self-report measures for depression in the elderly. It was created for

the older adult population, as its items were based on the characteristics of depression in the elderly. The short form of GDS, which consists of 15 questions, was used in the present study. Each question can be answered in a binary manner, yes or no, corresponding to a score of 1 or 0, respectively. The maximum score is 15. The Greek version has a Cronbach's alpha of 0.94 and shows, at the cutoff of 6/7, a sensitivity of 92.23%, and a specificity of 95.24%, for diagnosing depression.[8,9]

4. Short Anxiety Screening Test (SAST)

The SAST is a screening test for anxiety for elderly individuals. It is rated by the administrator. It consists of 10 questions that can be scored on a scale from 1 to 4, with a total score ranging from 10 to 40. Higher scores indicate greater anxiety. The Greek version of the SAST has a Cronbach's alpha of 0.763 and an intraclass correlation coefficient for reproducibility of 0.763. If someone scores above the cutoff point of 23, they are considered to have clinically significant anxiety symptoms.[10,11]

5. World Health Organization-Five Well-Being Index (WHO-5)

The WHO-5 is a self-administered test that consists of five questions regarding subjective sense of well-being. Each question is scored on a scale of 0 to 5. The total score can be calculated either as a raw score (in that case, 25 is excellent, while a score below 13 is indicative of possible depression) or multiplied by 4 in order to calculate the percentile, regarding the sense of wellbeing, which each individual belongs. It was translated and used in Greek.[12,13]

Statistical analysis

A descriptive analysis of the final sample was performed. Numeric variables are presented as mean±-standard deviation, while categorical variables are presented as numbers (percentages). Participants' TYM scores were compared between each other in relation to their sociodemographic (gender, education, type of household, living with someone else or alone, and the municipality of residence) and physical health history binary characteristics using a Student's t-test. Furthermore, Pearson's correlation coefficients between TYM scores and age, GDS-15, SAST, and WHO-5 scores were applied. Finally, a stepwise linear multiple regression analysis was applied to determine the effect of every assessed significant independent sociodemographic, physical health history, and mental health factors on the overall variance of subjects' cognitive functions, as estimated by the TYM, which served as the dependent variable. Statistical significance was set at $p < 0.050$. SPSS for Windows was used for statistical analysis.

Results

The initial sample consisted of 362 primary care users: 99 (27.35%) men and 263 (72.65%) women. Of these, 186 (51.40%) were from Karditsa municipality and 176 (48.6%) from Alexandroupolis.

Ninety-five participants (26.25% of the initial sample) scored below the TYM cut-off (39/40) for dementia and were excluded from further analysis. Consequently, the final sample of the study consisted of 267 individuals, 74 men (27.72%) and 193 women (72.28%), aged 68.9±7.02 years. The mean scores of the TYM, GDS-15, SAST, and WHO-5 were 45.97±3.50, 2.86±2.56, 17.48±4.89, and 17.4±4.21, respectively.

Literate participants had significantly higher TYM scores than poorly educated or illiterate participants. In addition, subjects living with someone else in the same household had a significantly better performance in TYM than those living alone, and participants from Karditsa scored higher than those in Alexandroupolis.

On the other hand, no differences were found between men and women or between residents living in rented or owned accommodations regarding their TYM scores (table 1). Statistically significant differences were found in participants' TYM scores with regard to the following physical health history factors: vascular risk factors, lung problems, and overall physical health.

There were no differences in TYM scores among participants who were smokers or had any neurological, endocrine, kidney, or any other physical problems (table 2). There were statistically significant negative Pearson's correlations between TYM and age scores, and TYM and SAST scores. No statistically significant correlations were detected between TYM, GDS, TYM, and WHO-5 scores (table 3).

A linear stepwise regression model was tested with TYM scores as the dependent variable and the following independent variables: age, education, living with/without somebody else, vascular risk factors, overall physical health, SAST score, and lung problems. The results of the regression analysis are shown in table 4. The final regression model revealed three factors that interpreted 28.50% of the variance; these were age, lung problems, and vascular factors, while the SAST score was marginally excluded from the model (table 4).

Discussion

This study aimed to assess the possible associations of various sociodemographic, physical health history, and mental health factors with the cognitive function of non-demented primary healthcare users above 60 years

Table 1. Comparisons of TYM scores between participants' subgroups, defined by the assessed sociodemographic factors.

Socio-demographics	n	Status	Subjects n1 (%)	TYM scores Mean (SD)	p
Gender	267	Male	74 (27.7)	46.20 (3.62)	0.516
		Female	193 (72.3)	45.89 (3.46)	
Education	250	Literate	245 (98.0)	46.16 (3.46)	<0.001
		Poorly educated / illiterate	5 (2.0)	40.60 (0.55)	
Type of House	173	Owned	168 (97.1)	46.36 (3.41)	0.459
		Rented	5 (2.9)	45.20 (4.15)	
Living in the household	182	With somebody else	134 (73.6)	46.54 (3.33)	0.020
		Alone	48 (26.4)	45.19 (3.70)	
Municipality of residence	267	Alexandroupolis	121 (45.3)	45.30 (3.43)	0.004
		Karditsa	146 (54.7)	46.54 (3.47)	

TYM: Test Your Memory test

Table 2. Comparisons of TYM scores between subgroups, defined by the assessed medical history and current medical problem regarding participants' physical health.

Physical Health condition	Status	Subjects n (%)	TYM scores Mean (SD)	p
Vascular risk factors	Present	140 (52.4)	45.34 (3.36)	0.002
	Absent	127 (47.6)	46.68 (3.52)	
Lung Problems	Present	29 (14.4)	44.62 (3.48)	0.030
	Absent	172 (85.6)	46.15 (3.46)	
Smoking	Yes	23 (11.8)	46.35 (3.41)	0.679
	No	172 (88.2)	46.03 (3.47)	
Neurological problems	Present	15 (7.5)	44.80 (3.61)	0.196
	Absent	186 (92.5)	46.02 (3.48)	
Kidney problems	Present	5 (2.5)	45.80 (3.35)	0.936
	Absent	196 (97.5)	45.93 (3.51)	
Endocrine problems	Present	49 (24.4)	45.47 (3.42)	0.295
	Absent	152 (75.6)	46.07 (3.52)	
Any other physical health condition	Present	50 (24.9)	45.72 (3.63)	0.633
	Absent	151 (75.1)	45.99 (3.47)	
Overall physical health	Presence of at least one problem	145 (72.1)	45.33 (3.48)	<0.001
	Absence of any problem	56 (27.9)	47.46 (3.06)	

old, who were living in two medium-sized municipalities of Greece, Alexandoupolis and Karditsa.

In the 2011 population census, the combined population of Alexandroupolis and Karditsa municipalities was approximately 104,000 individuals. According to Greek demographic data,[14] approximately 26% of individuals were 60 years old or above. These two cities, which are 520 km apart, were selected to gain a broader perspective and more comprehensive results regarding Greek primary health care users. Our sample comprised 1.4% of the population. This is considered adequate according to the literature.[15]

To assess possible associations that the above-mentioned factors might have on the cognitive function of primary care users, we opted to exclude potential dementia cases where cognitive decline can be attributed mainly to dementia that overshadows any preexisting or current factor. Over a quarter of the participants scored below the cutoff point for dementia in the TYM. This is in accordance with the literature on dementia screening in such a sample.[16]

The rest of the participants were examined for the possible association that three sets of factors might have on their cognitive abilities. Among the examined sociode-

Table 3. Pearson's Correlations between TYM scores and Age, GDS-15, SAST, WHO-5 scores.

	n	Pearson's r Test Your Memory (TYM)	p
Age	267	−0.34	<0.001
Geriatric Depression Scale - Short Form (GDS-15)	182	−0.11	0.151
Short Anxiety Screening Test (SAST)	182	−0.17	0.020
World Health Organization Five Well - Being Index (WHO-5)	182	−0.03	0.705

Table 4. Multiple Regression analysis results of the following assessed factors: age, education, living with/without somebody else, vascular risk factors, overall physical health, SAST score, and lung problems.

Model	Beta	t	p	95.0% Confidence Interval for B	
				Lower Bound	Upper Bound
Age	−0.32*	−3.72	<0.001	−0.22	−0.07
Lung Problems 0: absent 1: present	−0.23*	−2.70	0.008	−4.40	−0.67
Vascular risk factor 0: absent 1: present	−0.20*	−2.32	0.022	−2.76	−0.22
SAST	−0.16*	−1.92	0.057	−0.32	0.01

Dependent variable: TYM, R^2 adjusted=0.258, F=10.119, p<0.001; TYM: Test Your Memory test, SAST: Short Anxiety Screening Test
*Standardized Coefficient

mographic factors, age, education, and living with/without somebody else in the same household, and living in Alexandroupolis or Karditsa municipality had a significant impact on cognitive function in univariate analyses. More specifically, age is negatively correlated with TYM scores, a finding that is in accordance with the literature that considers aging as the most important risk factor for cognitive decline.[17] Further, poorly educated/illiterate individuals scored far less in the TYM in the present study. This finding is quite consistent with the literature,[18,19] although it could be argued that participants with lower educational levels generally perform worse in tests in comparison to those with higher education.[20] Nevertheless, TYM is thought to be more balanced, regarding this issue, than most of the other tests, by allowing and negatively scoring any help given to the subjects for completion. Another factor that seemed to be beneficial regarding individuals' cognitive function was living with someone else in the same household. It is possible that interaction with others may help cognitive function. According to most of the literature (from different settings), contrary to our results, living alone does not seem to be a risk factor for cognitive decline, possibly because living alone is not necessarily considered synonymous with social isolation from friends and does not imply less social activities.[21] This finding requires further research to be fully understood.

Among the physical health history factors of the participants, vascular risk factors and lung problems were the only two factors where sufferers and non-sufferers had a statistically significant difference in their TYM scores in univariate analyses. This is consistent with the literature, where vascular health is rated as an important factor affecting cognitive function.[22] Most of the guidelines regarding methods to protect cognitive function include, as a top priority, the preservation of vascular health and handling of vascular risk factors, and more particularly, hypertension, arrhythmias, diabetes, and smoking. However, in our study, smoking itself did not seem to have any effect on cognitive function.[23]

On the other hand, in partial contrast with the findings of smoking, the association of lung issues with cognitive function is relatively scarce in the literature. However, this association was apparent in our study, in both univariate analyses and multiple regression analysis.[24,25] It is an interesting finding that can trigger more research in associating lung functioning and cognitive function.[26]

Neurological conditions in populations above 60 years of age are usually related to some form of stroke or brain damage, and are indicative of overall brain aging and loss of brain cells. Consequently, these problems are expected to affect cognitive function.[27] Thus, it is not surprising that

neurological problems did not have much impact on our comparisons, since most of the time they lead to significant cognitive decline and possible dementia.

An interesting finding was that individuals without a history of physical health problems showed better overall cognitive function. This is in accordance with the literature and shows that being generally healthy seem to be significantly associated with better cognitive function.[28]

Considering mental health risk factors and according to the results of the present study, only anxiety as measured by SAST had a significant negative correlation with TYM score, while depression as measured by GDS and sense of well-being as measured by WHO-5 did not. These interesting findings are in accordance with the findings of multiple regression analysis.[29]

The applied multiple regression analysis gave precedence to the following predictors of cognitive decline in our sample: aging, having a history of lung problems, having a history of vascular risk factors, and marginally increased anxiety as measured by SAST. The above model explains 25.8% of the variance of the sample's cognitive function. These results are fully consistent with the literature.[30,31]

In this study, age seems to play the most important role in cognitive function, even in individuals with no significant cognitive decline. The most striking finding is the almost complete absence of any mental health factor that affects the cognitive function of the participants. This seems to be a very interesting finding, since it is argued that cognition is sensitive to mental health problems such as depression. On the other hand, some studies argue that if cognitive decline is a symptom of elderly individuals being diagnosed with depression, it is quite possible that depression is a prodrome to dementia and dementia will follow in a relatively short period of time.[32] We must also point out that although the GDS is a screening test specifically designed for depression, the WHO-5 is also linked with depression, and low scores indicate possible depression.[33] The lack of correlation between GDS and TYM score can also justify the lack of any statistically significant correlation between WHO-5 score and TYM score in our sample.[34]

The main limitation of this study is that it was not prospective. In this sense, since this was a cross-sectional study, we could not test for any possible causality between any of the factors that we assessed and the course of participants' cognitive function and any possible association between these factors and their current cognitive function.

Our sample size was small, considering the number of factors that we had to assess. Although the overall initial sample size was deemed adequate, the number of factors that we assessed on many occasions divided the sample into subgroups with relatively small numbers. Therefore, a larger sample size would be advantageous for future studies.

Another issue is the fact that women are overrepresented in our sample, a limitation that may have influenced our findings. Nevertheless, men and women in our sample did not differ on their cognitive functions, as assessed by their performance in the TYM.

The last limitation that we can comment on is also a suggestion for further study. Even though we assessed a number of identified significant risk factors regarding the cognitive function of the elderly, and we managed to demonstrate their significance, most of the variance on elderly cognitive function was not attributed to any of the factors that we assessed. This can be attributed to the relatively small sample, as we pointed out, or to the fact that some important factors, such as genetic predisposition,[35] or lifestyle factors, such as physical exercise or socializing, were not assessed adequately, despite the fact that overall well-being was assessed.[36] Further study in these directions can help to detect more risk factors regarding the elderly's cognitive function.

In conclusion, cognition is among the most vital functions of primary healthcare users, especially those above 60 years of age. A large proportion of primary care users present with significant cognitive decline and need to be assessed further for possible dementia in order to be treated earlier and more efficiently. For the rest of the population, who are the majority, preservation of physical health, especially vascular and lung health, and anxiety alleviation, to a lesser extent, can help to counterbalance the effects of aging on cognitive function for as long as possible.

Studies like the present one can help primary health care practitioners to monitor their elderly patients regarding modifiable factors for cognitive decline in order to decrease or postpone the onset of severe cognitive deficits that can lead to poorer functioning and subsequent loss of their independence and sense of well-being.

References

1. Langa KM. Is the risk of Alzheimer's disease and dementia declining? *Alzheimers Res Ther* 2015, 7:34, doi: 10.1186/s13195-015-0118

2. Kosmidis MH, Vlachos SG, Costas AA, Yannakoula M, Dardiotis E, Hadjigeorgiou G et al. Dementia prevalence in Greece: the Hellenic Longitudinal Investigation of Aging and Diet (HELIAD). *Alzheimer Dis Assoc Disord* 2018, 32:232–239, doi: 10.1097/WAD.0000000000000249

3. Arai H, Ouchi Y, Yokode M, Ito H, Uematsu H, Eto F et al. Members of Subcommittee for Aging. Toward the realization of a better aged society: messages from gerontology and geriatrics. *Geriatr Gerontol Int* 2012, 12:16–22, doi: 10.1111/j.1447-0594.2011.00776.x

4. Maioli F, Coveri M, Pagni P, Chiandetti C, Marchetti C, Ciarrochi R et al. Conversion of mild cognitive impairment to dementia in elderly subjects: a preliminary study in a memory and cognitive disorder unit. *Arch Gerontol Geriatr* 2007, 44(Suppl 1):233–241, doi: 10.1016/j. archger.2007.01.032

5. Harada CN, Natelson Love MC, Triebel KL. Normal cognitive aging. *Clin Geriatr Med* 2013, 29:737–752, doi: 10.1016/j.cger.2013.07.002

6. Brown J, Pengas G, Dawson K, Brown LA, Clatworthy P. Self-administered cognitive screening test (TYM) for detection of Alzheimer's disease: cross sectional study. *BMJ* 2009, 338:b2030, doi: 10.1136/bmj.b2030a

7. Roganaki A, Vorvolakos T, Sokou E, Konstadinidis T, Samakouri M. "Standardization of Test Your Memory (TYM) Cognitive Assessment Test in Primary Care Subjects Regarding Their Overall Mental Health Status". *EC Psychology and Psychiatry* 2021, 10.3:04-13

8. Burke WJ, Roccaforte WH, Wengel SP. The short form of the Geriatric Depression Scale: a comparison with the 30-item form. *J Geriatr Psychiatry Neurol* 1991, 4:173–178, doi: 10.1177/089198879100400310

9. Fountoulakis KN, Tsolaki M, Iacovides A, Yesavage J, O'Hara R, Kazis A et al. The validation of the short form of the Geriatric Depression Scale (GDS) in Greece. *Aging* (Milano) 1999, 11:367–372, doi: 10.1007/BF03339814

10. Sinoff G, Ore L, Zlotogorsky D, Tamir A. Short Anxiety Screening Test–a brief instrument for detecting anxiety in the elderly. *Int J Geriatr Psychiatry* 1999, 14:1062–1071, doi: 10.1002/(SICI)1099-1166(199912)14:12<1062::AID-GPS67>3.0.CO;2-Q

11. Grammatikopoulos IA, Sinoff G, Alegakis A, Kounalakis D, Antonopoulou M, Lionis M. The Short Anxiety Screening Test in Greek: translation and validation. *Ann Gen Psychiatry* 2010, 9:1, doi: 10.1186/1744-859X-9-1

12. Bech P. Measuring the dimensions of psychological general well-being by the WHO-5. *QoL Newsletter* 2004, 32:15–16

13. Psychiatric Research Unit WHO Collaborating Centre in Mental Health. *WHO (Five) Well-Being Index (WHO-5)* (Cited 12 May 2021) Available from: https://www.psykiatri-regionh.dk/who-5/Documents/WHO5_Greek.pdf

14. Ελληνική Στατιστική Αρχή. *Resident population census 2011* (Cited 13 May 2021) Available from: www.statistics.gr/2011-census-pop-hous

15. Prince M, Stewart R, Ford T, Hotopf M. *Practical psychiatric epidemiology*. Oxford University Press, Norfolk, 2007

16. Iatrakia E, Panagiotis G, Simos B, Bertsiasa A, Duijkera G, Zaganasc I, et al; THALIS Primary Health Care Research Team/Network. Cognitive screening tools for primary care settings: examining the 'Test Your Memory' and 'General Practitioner Assessment of Cognition' tools in a rural aging population in Greece. *Eur J Gen Pract* 2017, 23:171–178, doi.org/10.1080/13814788.2017.1324845

17. American Psychological Association. Guidelines for the evaluation of dementia and age-related cognitive change. *Am Psychol* 2012, 67:1–9, doi: 10.1037/a0024643

18. Chapko D, McCormack R, Black C, Sta R, Murray A. Life-course determinants of cognitive reserve (CR) in cognitive aging and dementia – a systematic literature review. *Aging Ment Health* 2010, 22:915–926, doi: 10.1186/1744-859X-9-1

19. Rentería MA, Vonk JMJ, Felix G, Avila JF, Zahodne LB, Dalchand E, et al. Illiteracy, dementia risk, and cognitive trajectories among older adults with low education. *Neurology* 2019, 93:e2247–e2256, doi: 10.1212/WNL.000000000008587

20. Wilson RS, Yu L, Lamar M, Schneider JA, Boyle PA, Bennett DA. Education and cognitive reserve in old age. *Neurology* 2019, 92:e1041–e1050, doi: 10.1212/WNL.0000000000007036

21. Evans IEM, Llewellyn DJ, Matthews FE, Woods RT, Brayne B, Clare L; CFAS-Wales research team. Living alone and cognitive function in later life. A*rch Gerontol Geriatr* 2019, 81:222–233, doi: 10.1016/j.archger.2018.12.014

22. Czuriga-Kovács KR, Czuriga D, Csiba L. Influence of hypertension, alone and in combination with other vascular risk factors on cognition. *CNS Neurol Disord Drug Targets* 2016, 15:690–698, doi: 10.2174/1871527315666160518122721

23. Cannistraro RJ, Badi M, Eidelman BH, Dickson DW, Middlebrooks EH, Meschia JF. CNS small vessel disease: a clinical review. *Neurology* 2019, 92:1146–1156, doi: 10.1212/WNL.0000000000007654

24. Duggan EC, Piccinin AM, Clouston S, Koval AV, Robitaille A, Zammit AR, et al. A multi-study coordinated meta-analysis of pulmonary function and cognition in aging. *J Gerontol A Biol Sci Med Sci* 2019, 74:1793–1804, doi: 10.1093/gerona/glz057

25. Duggan EC, Graham RB, Piccinin AM, Jenkins ND, Clouston S, Muniz-Terrera G, Hofer SM. Systematic review of pulmonary function and cognition in aging. *J Gerontol B Psychol Sci Soc Sci* 2020, 75:937–952, doi: 10.1093/geronb/gby128

26. Koyanagi A, Lara E, Stubbs B, Carvalho AF, Oh H, Stickley A et al. Chronic physical conditions, multimorbidity, and mild cognitive impairment in low- and middle-income countries. *J Am Geriatr Soc* 2018, 66:721–727, doi: 10.1111/jgs.15288

27. Hachinski V, Einhäupl K, Ganten D, Alladi S, Brayne C, Stephan BCM, et al. Preventing dementia by preventing stroke: the Berlin Manifesto. *Alzheimers Dement* 2019, 15:961–984, doi: 10.1016/j.jalz.2019.06.001

28. Rosenberg A, Ngandu T, Rusanen M, Antikainen R, Bäckman L, Havulinna S et al. Multidomain lifestyle intervention benefits a large elderly population at risk for cognitive decline and dementia regardless of baseline characteristics: The FINGER trial. *Alzheimers Dement* 2018, 14:263–270, doi: 10.1016/j.jalz.2017.09.006

29. Krell-Roesch J, Syrjanen JA, Machulda MM, Christianson TJ, Kremers WK, Mielke MM et al. Neuropsychiatric symptoms, and the outcome of cognitive trajectories in older adults free of dementia: The Mayo Clinic Study of Aging. *Int J Geriatr Psychiatry* 2021, 36:1362–1369, doi: 10.1002/gps.5528

30. Armstrong NM, An Y, Shin JJ, Williams OA, Doshi J, Erus G et al. Associations between cognitive and brain volume changes in cognitively normal older adults *Neuroimage* 2020, 223:117289, doi: 10.1016/j.neuroimage.2020.117289

31. Tully PJ, Yano Y, Launer LJ, Kario K, Nagai M, Mooijaart SP et al. Variability in Blood Pressure and Brain Health Consortium; Variability in Blood Pressure and Brain Health Consortium. Association between blood pressure variability and cerebral small-vessel disease: a systematic review and meta-analysis. *J Am Heart Assoc* 2020, 9:e013841, doi: 10.1161/JAHA.119.013841

32. Bennett S, Thomas AJ. Depression and dementia: cause, consequence or coincidence? *Maturitas* 2014, 79:184–190, doi: 10.1016/j.maturitas.2014.05.009

33. Allgaier AK, Kramer D, Saravo B, Mergl R, Fejtkova S, Hegerl U. Beside the Geriatric Depression Scale: the WHO-Five Well-being Index as a valid screening tool for depression in nursing homes. *Int J Geriatr Psychiatry* 2013, 28:1197–1204, doi: 10.1002/gps.3944

34. Agüera-Ortiz L, García-Ramos R, Grandas Pérez FJ, López-Álvarez J, Montes Rodríguez JM, Olazarán Rodríguez FJ et al. Depression in Alzheimer's disease: a Delphi consensus on etiology, risk factors, and clinical management. *Front Psychiatry* 2021, 12:638651, doi: 10.3389/fpsyt. 2021.638651

35. Teh WL, Abdin E, Vaingankar JA, Shafie S, Jeyagurunathan A, Yunjue Z et al. Prevalence, lifestyle correlates, and psychosocial functioning among multi-ethnic older adults with mild cognitive impairment in Singapore: preliminary findings from a 10/66 population study. *Yale J Biol Med* 2021, 94:73–83, PMID: 33795984

36. Llewellyn DL, Lang IA, Langa KM, Huppert FA. Cognitive function and psychological well-being: findings from a population-based cohort. *Age Ageing* 2008, 37:685–689, doi: 10.1093/ageing/afn194

Ερευνητική εργασία

Συσχέτιση της νοητικής λειτουργίας μη ανοϊκών ηλικιωμένων εξυπηρετούμενων της πρωτοβάθμιας φροντίδας υγείας με σωματικούς, ψυχικούς, κοινωνικούς και δημογραφικούς παράγοντες

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ΠΕΡΙΛΗΨΗ

Η διατήρηση των νοητικών λειτουργιών του πληθυσμού είναι αυξημένου ενδιαφέροντος για όλα τα συστήματα υγείας. Η ανίχνευση των παραγόντων που σχετίζονται με τις νοητικές λειτουργίες είναι ένα ζήτημα αυξημένου ενδιαφέροντος με δι- πλό σκοπό τη θεραπεία ευάλωτων ατόμων και την εφαρμογή στρατηγικών ώστε να καθυστερήσουν τη σχετιζόμενη με την ηλικία νοητική έκπτωση. Η μελέτη αυτή σκοπεύει στο να αναδείξει κοινωνικούς, δημογραφικούς, σωματικούς και ψυχικούς παράγοντες που σχετίζονται με τη νοητική λειτουργία μη ανοϊκών ηλικιωμένων εξυπηρετούμενων από την πρωτοβάθμια φροντίδα υγείας. Το δείγμα μας αποτελείτο από 362 συμμετέχοντες, εξυπηρετούμενους της πρωτοβάθμιας φροντίδας υγείας, με ηλικία από 60 ετών και άνω. Ένα ερωτηματολόγιο που αφορούσε σε κοινωνικά και δημογραφικά χαρακτηριστικά καθώς και το ιστορικό της σωματικής υγείας τους υγείας, μαζί με μια συστοιχία ψυχομετρικών εργαλείων που αποτελείται από το Test Your Memory (TYM) test, την Geriatric Depression Scale - Short Form (GDS-15), το Short Anxiety Screening Test (SAST) και το World Health Organization - Five Well-Being Index (WHO-5) χορηγήθηκε σε όλους τους συμμετέχοντες. Οι συμμετέχοντες που βαθμολογήθηκαν κάτω από 39/40 στο TYM, που είναι και το σημείο διακοπής παθολογίας για τη διαλογή της άνοιας, στην έκδοση του τεστ που χρησιμοποιήσαμε, εξαιρέθηκαν από περαιτέρω αξιολόγηση. Για τους υπόλοιπους συμμετέχοντες, 267 στο σύνολο, η βαθμολογία που συγκέντρωσαν στο TYM συσχετίστηκε αρνητικά και στατιστικά σημαντικά με την ηλικία και τη βαθμολογία στο SAST. Συμμετέχοντες με ιστορικό πνευμονικών και αγγειακών προβλημάτων υγείας βαθμολογήθηκαν με χαμηλότερη βαθμολογία στο TYM όπως έκαναν και αυτοί που είχαν πτωχή εκπαίδευση, που έμεναν μόνοι τους και που κατοι- κούσαν στην Αλεξανδρούπολη. Τέλος, οι υγιείς συμμετέχοντες βαθμολογήθηκαν με υψηλότερη βαθμολογία από τους συμμε- τέχοντες που υπέφεραν από μία τουλάχιστον ιατρική κατάσταση. Η γραμμική ανάλυση πολλαπλής παλινδρόμησης ανέδειξε ένα μοντέλο (Adjusted R^2=25,80, F=10,11, p<0,001) με τρεις παράγοντες, ηλικία (beta=−0,32), προβλήματα πνευμόνων (beta= −0,23), αγγειακούς παράγοντες (beta=−0,20), το οποίο μπορεί να προβλέψει το 25,80% της μεταβλητότητας της βαθμολογίας του TYM. Η διατήρηση της σωματικής υγείας, ειδικά της υγείας των πνευμόνων και των αγγείων μαζί με την ανακούφιση από το άγχος βοηθά στο να αντισταθμίσει την αρνητική επίδραση της γήρανσης στις νοητικές λειτουργίες των μη ανοϊκών ηλικι- ωμένων εξυπηρετούμενων από την πρωτοβάθμια φροντίδα υγείας.

ΛΕΞΕΙΣ ΕΥΡΕΤΗΡΙΟΥ: Πρωτοβάθμια φροντίδα υγείας, νοητική έκπτωση, ηλικιωμένοι, πνευμονολογικά προβλήματα, αγγεια- κοί παράγοντες.

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