Applicability of the Hungarian Version of the Test Your Memory in General Practice for Screening Mild Cognitive Impairment and Early Stage Dementia

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Article

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Abstract: Background: dementia is a significant health issue worldwide. Mild cognitive impairment (MCI) can transform into dementia over time. General practitioners may be the first to notice the cognitive deficit, so they may need a screening test in the event of suspicion, which they must be able to use under great time pressure. We examined the usability of the Hungarian Test Your Memory (TYM-Hun) self-administered dementia test in general practice, and with the results of the received tests, we tried to draw conclusions regarding the population. Methods: In the four Hungarian cities with medical universities, general practitioners filled out 368 questionnaires with their clients over 50 years of age. Results: the total scores of the test showed a significant correlation with education and the type of occupation, while a significant negative correlation with age. We found the clock drawing test and recall indicates cognitive decline the earliest. Based on the TYM-Hun results, the prevalence levels for MCI and dementia are slightly higher in Hungary than globally. Conclusion: the test can sensitively indicate MCI and early-stage dementia as a screening test, and two of its subtests can raise the possibility of cognitive impairment at an earlier age than the others.

Keywords: dementia, mild cognitive impairment, elderly, primary care, GP, family physician

1. Introduction

Over the years, it has become vital to learn about and recognize the disease with an increasing burden on society, dementia, diagnose it in time, and involve patients in the appropriate treatment. In many cases, it can be seen that with therapy and intervention started in time, education and support of the caregivers the number of years lived qualitatively in a family environment can be extended, the placement of patients in social homes is delayed, and the caregiver's quality of life can also be improved [1,2,3]. This requires, on the one hand, the education of the general population, by which they can recognize the initial signs, and with the help of that, the examination of potential patients can begin. Accordingly, initiatives such as Alzheimer's cafes and World Alzheimer's Month have started and are becoming more and more popular [4]. On the other hand, a professionally prepared team must wait for clients applying for screening. Most people reluctantly go to the

examination, many do not even experience the symptoms themselves, but they rather get involved due to the nagging of family members and start looking for a solution. Also, it is easier to face this hesitation if they visit a familiar doctor with their problem, and if they depart on the way with a family member, it is even more unequivocal that they choose a reliable specialist whom they all know, the family doctor.

It is therefore of utmost importance that family physicians have the appropriate tools at their disposal to diagnose the disease, especially with regard to meeting the increased time pressure and the adequate distribution of available personal resources. And although there are extensive screening tests available in Hungarian (ADAS-Cog, MoCA, and ACE), they tend to be time-consuming and require a person with professional knowledge to take them [5,6,7,8,9].

In Hungary, the screening of dementias and the organization of patient care are in their infancy. It is also not clear which profession should provide care for the clients, and the provision and reception capacity of the social sphere has only recently begun to develop, and it is rather possible to report on its shortcomings: private institutions provide their services at high prices, and the number of publicly funded ones is very limited [10]. The general practitioner's recommendation in Hungary does not include a screening protocol for the most common form of dementia, Alzheimer's disease, only for the vascular type, and the application of it may also exceed the time and personnel resources available to the general practitioner [11].

Examining the attitude of Hungarian general practitioners, researchers found that half of the specialists perform tests if cognitive decline is suspected and that for them time is the most important asset, as they want to have more time for a patient on the one hand, and on the other hand, to have an economical and time-saving dementia detection tool in their hands. The other half of the specialists who didn't perform any tests reported the lack of time as the most common reason [12,13]. Those family physicians who carry out screening in the direction of dementia, mainly use, in accordance with the current recommendations, the time-consuming and indicative of a more severe stage of cognitive decline Mini Mental State Examination (MMSE) or the clock drawing test with their patients [14].

In our previous studies, due to the above reasons, we translated, examined, and validated a test that can be used in the screening of dementia, which spares the doctor and their colleagues the time-consuming test taking. This is the Test Your Memory (TYM), the Hungarian version of which is TYM-HUN: a self-administered test that, by choosing the appropriate cut-off point, can be used very reliably for the screening of both early-stage dementia (sensitivity 94%, specificity 94%) and mild cognitive impairment (sensitivity 80%, specificity 96%) [15, 16].

To the best of our knowledge, a comprehensive population screening is yet to be carried out in Hungary, which is supposed to examine the incidence of dementia. Concerning the epidemiology of the disease, conclusions were primarily drawn from coding and literature data [17,18]. Although there were post-mortem studies that found that the proportion of people suffering from vascular dementia in the Hungarian sample was significantly higher than the international rate [19]. Perhaps it is also due to this Hungarian peculiarity that, according to general practitioners, the most common form in Hungary is the vascular type of dementia, and they are not far from the truth with this belief, and perhaps that is why an officially recommended screening protocol is only available for this type, but of course, it can also be the cause of the distorted opinion of general practitioners [20].

2. Materials and Methods

2.1. Participants and Location

In our multicenter study, we wanted to see what proportion of the Hungarian population over the age of 50 who have not yet been diagnosed with dementia shows the symptoms of mild cognitive impairment or mild dementia in an approximately representative sample. To do so, we disseminated TYM-HUN in the four Hungarian cities with medical universities: Budapest, Pécs, Szeged, and Debrecen. We put together a test battery for family doctors willing to cooperate in these Hungarian cities, which included written consent, a demographic data survey, and the TYM-HUN test itself. The

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demographic questions evolved and, after we expanded them, included: education, marital status, number of people living in the same household, active/retired lifestyle, type of occupation, regular exercise, depressed mood, and forgetfulness experienced by self or by a relative/professional. We planned to take a total of 400 tests from the four cities therefore we disseminated 400 tests. We received a total of 368 fully completed tests from the family doctors: 9 respondents do not fall within the age criteria, while 23 changed their mind while completing the test and did not complete the test or did not sign their consent to participate in the study. Therefore, we can say that convenience sampling took place, which was carried out by family doctors, who were motivated to participate in the study, on their patients who also had the desire to take part in the examination.

2.2. The Study Instrument

The TYM test is a paper-based, two-sided test that is self-administered. The first page starts with questions about orientation: name, date of birth, age, and date of completion (10 points), followed by sentence copying (2 points) and a reminder of the sentence. After that, there is a test of current and past general knowledge (3 points), then simple calculations (4 points), and a verbal fluency test (4 points). The next step is identifying similarities (4 points). At the bottom of the page, they get a second reminder about the copied sentence. On the second page, they have to recognize and name the parts of a figure (5 points), then connect the dots forming a letter, testing visuospatial skills (3 points). This is followed by a clock-drawing test (4 points), and finally, the previously copied sentence, for which they were given two reminders, must be recalled (6 points). At the end of the test, 5 points are added up to for how much help the person completing the test had to be provided, the less help means the more point [15]. From the details above, it can be seen that the TYM is a very complex test that examines many cognitive areas.

When performing the tests, we asked the colleagues to provide minimal supervision, and in such cases, it can be useful if a relative accompanies the patient, who can supervise during the completion of the test, in which case the most important rule is that the person completing the test cannot turn the sheet back once it has been turned over. The delayed recall of the sentence is the subtask most sensitive to Alzheimer's dementia and aMCI [21,22,23]. Furthermore, we asked the colleagues who completed the tests in their practices to evaluate the tests, because they can judge the correctness of the answers, given that the test asks for both the time of birth and the current date.

2.3. Aim of the Study

From the results of the tests, we tried to determine which demographic data the TYM-Hun score correlates with. In addition, we divided the test into its subtests to determine which subtest indicates cognitive decline at the earliest age. Finally, based on the scores of the collected questionnaires and our previous investigations, we tried to draw epidemiological conclusions regarding the cognitive state of the Hungarian population over 50 years of age.

2.4. Statistics

We analyzed our data by using SPSS (v.26) and presented them as means, medians, and frequencies. Since the variables had non-normal distribution, we used Mann-Whitney U tests, Kruskall-Wallis tests, and Spearman rank correlations to compare the score of groups and to examine the relationship between the factors. To investigate in which age group appears first the decreased score in different cognitive functions we performed Chi-square tests and when the cell frequency was less than 5, we used Fisher's exact test.

2.5. Ethical Approval

All patients gave written informed consent to participate in the study. We received permission from the Hungarian Medical Research Council's Scientific and Research Ethics Committee to conduct our study with permission number: 28507-2/2019/EKU.

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2.6. Hypothesis

As we found in our previous studies, we assumed that there would be no correlation between education, gender, and mood on the test score. However, we hypothesized that those who live alone and those who lead a sedentary lifestyle will achieve a lower score. In addition, we hoped to find results similar to international samples regarding the proportion of dementia and mild cognitive impairment among the elderly Hungarian population.

3. Results

368 participants filled out our questionnaires with an average age of 69,71 years. Table 1 shows the demographic characteristics of our research. We also included missing participants because additionally, after beginning our survey, we added more demographic factors to be considered in our analysis and we were not able to collect these data from the previously surveyed persons. This allowed us to gain a more comprehensive understanding of the relationship between demographic factors and cognitive function scores.

Table 1. Demographic characteristics.

	N	Missing
Gender		
Female	223	0
Male	145	
Education		
Primary education or less	103	1
Secondary education	153	
Bachelor's or higher level	111	
Marital status		
In Relationship	225	1
Divorced	55	
Single	24	
Widowed	63	
Number of persons living in the same household		
0	73	118
1	111	
2	40	
3	12	
4 or more	14	
Occupation		
Active worker	42	113
Retired	213	
Type of occupation		
Passive mental work	63	135
Active mental work	82	
Physical work	88	
Doing sports for 3x45 minutes/week		
Yes	85	117
No	166	
Deprived mood		
Yes	51	5
No	312	
Self-detected memory problems		
Yes	137	114
No	117	
Memory problems detected by others		
Yes	45	112
No	211	

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Number of children		
0	5	256
1	26	
2	60	
3 or more	21	

Table 2 shows the categories we determined in our previous studies: scoring 50–45 point on the TYM-Hun shows a mentally healthy individual; scoring between 44 and 36 suggest MCI; and a score of 35 or less suggests dementia [15,16].

Table 2. Frequency of healthy, MCI, and dementia scores on the TYM-Hun.

TYM-Hun scores (mental state)	Number of cases	Percentage
50-45 (healthy)	248	67.4
44-36 (MCI)	93	25.3
35 or less (dementia)	27	7.3
Total	368	100

Table 3 shows both the medians and means for the scores because in some cases where the median scores were the same across groups, reporting the means helps to show any subtle differences in the outcomes. The results of our study show that there are significant differences in cognitive function scores based on the level of education. Individuals with higher levels of education scored better in the cognitive function domains of Copying, Facts, Sums, Similarities, Visuospatial, Clock drawing, Recall, Help, and also in total compared to those with lower levels of education. Concerning occupation, participants who were retired reported lower levels of cognitive functions in the domains of Similarities, Visuospatial, Recall, Help, and in the total score as well in comparison to those who were active workers. Physical workers had lower scores regarding Recall, while passive and active mental workers scored higher. Participants who were not doing sports for 3x45 minutes/week had weaker arithmetic skills. Subjects who reported feeling a deprived mood had poorer performance in the areas of Orientation, Copying, Visuospatial, and Recall. Individuals who acknowledged a memory problem showed a decline in their scores in the domains of Recall and total score. Participants whose memory issues were recognized by others reported lower levels of cognitive functions concerning Fluencies, Recall, and also the total score.

Table 3. Subtests medians and means according to the different demographic characteristics.

Demographic Factors	Orientation		Copying		Facts		Sums		Fluencies		Similarities		Naming		Visuospatial		Clock drawing		Recall		Help		Total	
	Medians	Means	Medians	Means	Medians	Means	Medians	Means	Medians	Means	Medians	Means	Medians	Means	Medians	Means	Medians	Means	Medians	Means	Medians	Means	Medians	Means
Gender																								
Female	10	9.65	2	1.83	3	2.63	4	3.61	4	3.68	4	6.62	5	4.8	3	2.46	4	3.35	6	4.78	5	4.64	47	45.04
Male	10	10	2	1.84	3	2.7	4	3.48	4	3.69	4	3.55	5	4.7	3	2.57	4	3.36	5	4.36	5	4.61	46	44.42
p	0,321		0,976		0,105		0,137		0,772		0,478		0,131		0,450		0,682		0,106		0,653		0,120	
Education																								
Primary education or less	10	9.48	2	1.68	3	2.45	4	3.27	4	3.5	4	3.28	5	4.67	3	2.21	4	3.16	5	3.79	5	4.39	44	41.87
Secondary	10	9.71	2	1.91	3	2.66	4	3.64	4	3.71	4	3.71	5	4.85	3	2.54	4	3.47	6	4.9	5	4.69	47	45.77

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education																								
Bachelor's or higher level	10	9.66	2	1.87	3	2.86	4	3.71	4	3.81	4	3.71	5	4.72	3	2.68	4	3.38	6	4.98	5	4.77	47	46.14
p	0,116		**0,000**		**0,000**		**0,003**		0,202		**0,002**		0,150		**0,001**		**0,031**		**0,000**		**0,013**		**0,000**	
Marital status																								
In Relationship	10	9.59	2	1.86	3	2.71	4	3.52	4	3.65	4	3.61	5	4.78	3	2.56	4	2.42	6	4.75	5	4.7	47	45.14
Divorced	10	9.71	2	1.85	3	2.55	4	3.64	4	3.71	4	3.58	5	4.78	3	2.4	4	3.4	6	4.67	5	4.6	47	44.89
Single	10	9.83	2	1.79	3	2.75	4	3.71	4	3.71	4	3.58	5	4.5	3	2.25	3	2.88	5	4.13	5	4.58	46	43.71
Widowed	10	9.65	2	1.78	3	2.59	4	3.6	4	3.75	4	3.54	5	4.78	3	2.43	4	3.25	5	4.29	5	4.44	45	44.1
p	0,289		0,512		0,132		0,896		0,657		0,820		0,071		0,242		0,054		0,241		0,080		0,108	
Occupation																								
Active worker	10	9.64	2	1.93	3	2.76	4	3.67	4	3.79	4	3.83	5	4.76	3	2.88	4	3.67	6	5.38	5	4.9	48,5	47.21
Retired	10	9.57	2	1.77	3	2.58	4	3.49	4	3.67	4	3.6	5	4.69	3	2.38	4	3.23	5	4.49	5	4.5	46	43.97
p	0,808		0,095		0,110		0,302		0,711		**0,019**		0,721		**0,003**		0,018		**0,004**		**0,005**		**0,000**	
Type of occupation																								
Passive mental work	10	9.63	2	1.87	3	2.71	4	3.78	4	3.7	4	3.75	5	4.84	3	2.6	4	3.33	6	5.03	5	4.52	47	45.78
Active mental work	10	9.6	2	1.84	3	2.66	4	3.62	4	3.79	4	3.74	5	4.71	3	2.56	4	3.41	6	4.96	5	4.76	47	45.66
Physical work	10	9.53	2	1.69	3	2.51	4	3.31	4	3.52	4	3.44	5	4.59	3	2.31	4	3.19	5	4.05	5	4.49	45	42.64
p	0,571		0,073		0,084		0,005		0,200		0,081		0,496		0,165		0,350		**0,006**		0,394		0,106	
Doing sports for 3x45 minutes/week																								
Yes	10	9.66	2	1.82	3	2.58	4	3.35	4	3.71	4	3.67	5	4.62	3	2.48	4	3.27	6	4.76	5	4.72	47	44.65
No	10	9.55	2	1.8	3	2.65	4	3.61	4	3.67	4	3.61	5	4.74	3	2.46	4	3.3	5	4.58	5	4.51	47	44.48
p	0,316		0,571		0,278		**0,039**		0,980		0,871		0,391		0,785		0,548		0,253		0,126		0,495	
Deprived mood																								
Yes	10	9.27	2	1.65	3	2.53	4	3.41	4	3.59	4	3.61	5	4.76	3	2.24	4	3.31	5	4.33	5	4.49	45	43.2
No	10	9.71	2	1.88	3	2.68	4	3.58	4	3.7	4	3.58	5	4.76	3	2.55	4	3.36	6	4.67	5	4.65	47	45.11
p	**0,000**		**0,003**		0,127		0,119		0,383		0,483		0,737		**0,045**		0,410		**0,026**		0,408		0,038	
Self-detected memory problems																								
Yes	10	9.51	2	1.79	3	2.57	4	3.55	4	3.65	4	3.62	5	4.63	3	2.37	4	3.34	5	4.47	5	4.52	46	44.01
No	10	9.68	2	1.82	3	2.67	4	3.49	4	3.74	4	3.66	5	4.79	3	2.57	4	3.26	6	4.87	5	4.62	47	45.17
p	0,144		0,424		0,344		0,598		0,433		0,514		0,332		0,186		0,914		**0,043**		0,902		**0,022**	
Memory problems detected by others																								
Yes	10	9.42	2	1.6	3	2.47	4	3.64	4	3.47	4	3.71	5	4.47	3	2.24	4	3.16	5	3.53	5	4.31	45	42.02
No	10	9.62	2	1.84	3	2.64	4	3.5	4	3.73	4	3.62	5	4.75	3	2.51	4	3.33	6	4.88	5	4.63	47	45.05
p	0,805		0,060		0,150		0,470		**0,037**		0,546		0,103		0,314		0,407		**0,000**		0,143		**0,017**	

We examined the correlation between cognitive function and demographic factors using the TYM test. We found that age had a weak, significant negative correlation with the domains of

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Copying, Facts, Sums, Similarities, Naming, Visuospatial, Clock-drawing, Recall, and Help, as well as a moderate, significant negative correlation with the Total score. Additionally, we found that the number of children had no significant correlation with any of the cognitive function domains, and the number of persons in the same household had a weak, significant positive correlation with the domains of Recall and Help (Table 4).

Table 4. The effect of age, children and household members on the TYM-Hun scores.

Demographic factors	Orientation	Copying	Facts	Sums	Fluencies	Similarities	Naming	Visuopatial	Clock drawing	Recall	Help	Total score
Age	-0.089	-0.221**	-0.133*	-0.116*	-0.530	-0.161*	-0.148*	-0.260**	-0.268**	-0.269**	-0.322**	-0.401**
Number of children	0,030	0,008	0,017	-0,121	0,033	-0,165	0,175	0,092	-0,035	0,092	-0,145	0,012
Number of persons in the same household	-0,066	0,034	-0,030	0,047	-0,022	-0,005	-0,079	0,071	0,048	0,128*	0,166*	0,121

*$p<0.05$
**$p<0.05$

Table 5 shows the count and expected count of individuals in the 50–65, 66–80, and 80+ age groups who scored less than the maximum on various domains of the TYM Test. The chi-square test results indicate that there is a statistically significant difference between the age groups and the scores of different cognitive abilities. The oldest group scored lower in the Copying, Similarities, and Visuospatial domains ($p<0.001$,$p=0.001$,$p<0.001$), while the Clock drawing and Recall areas showed a deficit in the age group of 66-75 years with higher observed counts than expected in the groups of lower scores ($p<0.001$,$p<0.001$).

Table 5. Chi-square tests on the different subtests in three age categories.

Subtests		**Age(years)**				
Orientation		**<65**	**66-75**	**76<**	**Total**	**Chi-square test**
10 points	Count	90	111	72	273	$\chi2(2)=2.563$; $p=0.278$
	Expected Count	86.1	109.1	77.9		
Less than 10 points	Count	26	36	33	95	
	Expected Count	29.9	37.9	27.1		
	Total	116	147	105	368	
Copying		**Age(years)**				
		<65	**66-75**	**76<**	**Total**	**Fisher's exact test**
2 points	Count	112	132	84	328	$p(2)=15.687$; **$p<0.001$**
	Expected Count	103.4	131	93.6		
Less than 2 points	Count	4	15	21	40	
	Expected Count	12.6	16	11.4		
	Total	116	211	41	368	
Facts		**Age(years)**				
		<65	**66-75**	**76<**	**Total**	**Chi-square test**
3 points	Count	89	103	66	258	$\chi2(2)=5.057$; $p=0.080$
	Expected Count	81.3	103.1	73.6		
Less than 3 points	Count	27	44	39	110	
	Expected Count	34.7	43.9	31.4		
	Total	116	211	41	368	
Sums		**Age(years)**				
		<65	**66-75**	**76<**	**Total**	**Chi-square test**
4 points	Count	91	100	68	259	$\chi2(2)=5.602$; $p=0.061$
	Expected Count	81.6	103.5	73.9		
Less than 4 points	Count	25	47	37	109	
	Expected Count	34.4	43.5	31.1		
	Total	116	211	41	368	
Fluencies		**Age(years)**				
		<65	**66-75**	**76<**	**Total**	**Chi-square test**
4 points	Count	93	117	81	291	$\chi2(2)=0.345$; $p=0.842$

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	Expected Count	91.7	116.2	83		
Less than 4 points	Count	23	30	24	77	
	Expected Count	24.3	30.8	22		
	Total	116	211	41	368	
Similarities		**Age(years)**				
		<65	**66-75**	**76<**	**Total**	**Chi-square test**
4 points	Count	96	114	65	275	
	Expected Count	86.7	109.9	78.5		
Less than 4 points	Count	20	33	40	93	$\chi2(2)=13.724$; **p=0.001**
	Expected Count	29.3	37.1	26.5		
	Total	116	211	41	368	
Naming		**Age(years)**				
		<65	**66-75**	**76<**	**Total**	**Chi-square test**
5 points	Count	105	122	83	310	
	Expected Count	97.7	123.8	88.5		
Less than 5 points	Count	11	25	22	58	$\chi2(2)=5.747$; p=0.056
	Expected Count	18.3	23.2	16.5		
	Total	116	211	41	368	
Visuospatial		**Age(years)**				
		<65	**66-75**	**76<**	**Total**	**Chi-square test**
3 points	Count	104	113	64	281	
	Expected Count	88.6	112.2	80.2		
Less than 3 points	Count	12	34	41	87	$\chi2(2)=25.188$; **p<0.001**
	Expected Count	27.4	34.8	24.8		
	Total	116	211	41	368	
Clock drawing		**Age(years)**				
		<65	**66-75**	**76<**	**Total**	**Chi-square test**
4 points	Count	91	89	49	229	
	Expected Count	72.2	91.5	65.3		
Less than 4 points	Count	25	58	56	139	$\chi2(2)=23.979$; **p<0.001**
	Expected Count	43.8	**55.5**	39.7		
	Total	116	**211**	41	368	
Recall		**Age(years)**				
		<65	**66-75**	**76<**	**Total**	**Chi-square test**
6 points	Count	74	74	39	187	
	Expected Count	58.9	74.7	53.4		
Less than 6 points	Count	42	**73**	66	181	$\chi2(2)=15.684$; **p<0.001**
	Expected Count	57.1	**72.3**	51.6		
	Total	116	211	41	368	
Help		**Age(years)**				
		<65	**66-75**	**76<**	**Total**	**Chi-square test**
5 points	Count	108	116	63	287	
	Expected Count	90.5	114.6	81.9		
Less than 5 points	Count	8	31	42	81	$\chi2(2)=35.304$; **p<0.001**
	Expected Count	25.5	32.4	23.1		
	Total	116	211	41	368	

4. Discussion

Our results can be interpreted in two ways: on one hand, in terms of their epidemiological aspects, and on the other hand, with regard to the test.

Mention first the epidemiological aspects: the results of our study conducted in four university cities illustrate that a non-negligible part of the population visiting a family doctor without a diagnosis of dementia displays symptoms of cognitive decline. Although our study is not representative, comparing our results with international data, we can discover the slight differences between the international and the Hungarian data regarding mild cognitive impairment (consequently 16–21% vs. 25.3%) [24,25,26] and dementia (consequently 4–5.7% vs. 7.3%).[26,27] If we were able to apply the results of our study to the entire population, we could say that the general population in our country suffers from certain forms of cognitive decline at a slightly higher rate than expected on an international basis. This could be more worrisome if we would consider that our data

is gathered from the 50+ population devoted to participating, in urban regions, and conducted by motivated GPs.

The trend is that some MCIs transform into dementia, while others do not. [29,30,31] If we take the cases we identified with MCI as a basis and estimate their transformation with international trends, we get worrying results for the future, which require immediate, or at least urgent, vigorous steps at the national level regarding the strengthening of the social sphere by the legislators and decision-makers.

Nearly 40% of Hungary's population is over 50 years of age (3,863,828 people) [32]. In the future, this will cause a significant strain on the health sector, which is already in a difficult situation, since currently a significant number of people living with dementia are cared for here, and less so in the social sphere, which is in an even more disadvantaged position.

According to recent surveys, we spend only one-fifth of the European average on financing people with dementia and the number of long-term care institutions is very limited and inaccessible due to high cost and the services provided by the state do not allow family members to care for their loved ones, the person living with dementia, at home. [10,33].

Secondly regarding the TYM-Hun: some of our hypotheses could not be corroborated; in our current study, those who had lower educational levels performed worse compared to those who had higher degrees. Implementing targeted educational programs for families can reduce their burdens and depressive symptoms caused by the uncertainty about handling their family member's condition and educating the patients can also be a possible treatment for reducing their general behavioral problems or might delay their institutionalization. [34,35] In addition, however, gender and self-reported mood were not significantly correlated to the total scores as we presumed. However, it was also not possible to support that self-reported exercise is an advantageous delayer of cognitive decline (or of a decrease in TYM-Hun total score). And finally, we were able to partially support our hypothesis that more people living in the same household can delay the onset of cognitive decline.

Dividing the test into its subtests and analyzing them in this way, taking into account different demographic characteristics, allowed us to determine in which subgroups which subtests show impairment. Several demographic characteristics showed differences in distinct areas, but overall, the total score of the test was significantly influenced by only four things: education, type of occupation, and memory problems reported by oneself or others. This means that the test, as it examines several cognitive domains, gives an excellent picture of the cognitive abilities of the person completing it, and although there may be differences in several subtests depending on demographic characteristics, the total score of the test is not affected significantly only by few factors. And even these few are already known to modify cognitive abilities in a negative direction, such as education or retirement-use it or lose it [36–38] or are attention-grabbing, such as the memory problems reported by oneself or by others, which leads to the conclusion that in the case of persons struggling with such problems, or someone else notices such difficulties in them, direct screening for dementia is recommended [39,40].

On a practical level, the most important result of our research is that we found which two subtests show the difference at the earliest age: drawing a clock and recalling sentences. From this point of view, our advice to general practitioners has proved to be useful, to supervise carefully so the person taking the test cannot reverse their test, once it has already been turned to its other side. In this sense, the national recommendation, which we referred to earlier, can be relevant and can help early detection, as it contains exactly these two elements. However, we are still convinced that compared to the recommended tests, the TYM-Hun is a test that can be taken using fewer human resources, requires minimal supervision, and examines numerous cognitive areas in more detail.

Based on these two subtests, or even the entire TYM test, it would be worthwhile to create an online version that can be comfortably completed. This could easily eliminate the possibility of fallacies; the time of administration could be measured, which could serve as an additional clue towards the diagnosis; the older age group is also quite good at computers and it seems that most of them can complete such a test; it can also be shared on social media platforms, which the elderly population likes to use; with anonymity, the participation becomes largely risk-free, so the stressful

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effect of the doctors' office is not so strong and the fear of the stigma associated with the diagnosis can be reduced; at the same time, participants might have immediate feedback elicited from the score achieved [41].

To reduce functional decline in early stages of dementia is one of the most important task to mention in primary care. A study conducted in Hong Kong found that combining cognitive training, mind-body physical exercise, and nurse-led risk factor modification in a multi-domain approach might be applicable and may participate in reducing the cognitive decline of elderly patients who have MCI. Although the study was a pilot, it raised some cardinal questions concerning the topic [42]. A work group of national experts also developed new recommendations feasible by primary care clinicians to initiate primary prevention conversations about cognitive decline. [43]. Memory clinics might also be a great help in close working relationships with primary care [44].

5. Conclusions

Although we did not manage to reach a representative sample, we believe that we managed to achieve good results and a sample number close to the representative with the screening test carried out in Hungarian GP practices, the results of which can also be considered a pilot test for a later, comprehensive, and representative survey. Because our investigation can be a cause for concern if we take into account the number of people currently living at home who have not yet been diagnosed with the possibility of minor and major cognitive disorders in the clientele of general practitioner practices. This calls for a comprehensive investigation and quick action at the appropriate levels, otherwise, the situation threatens to head towards a disaster, considering that in many places in Hungary, the care of people living with dementia for a longer period is currently assigned to hospitals instead of the appropriate social sector, and often this means hospitalization, which is the form of care with the highest costs [45]. Considering the mental burden, this care is also the one that entails the highest costs, as it very often leads to the mortality of the admitted client, and unfortunately in Hungary, the most common case is that people with dementia die in hospital [46,47]. It is also not uncommon that at the time of the discovery of dementia, the person is admitted to a hospital ward, which could also be prevented if it was screened in the general practitioner's practice and the management of the patient's referring began, and among those living with dementia, the number of those cases is also higher who could be treated with intensive outpatient care but instead they are admitted (unnecessarily) to the hospital [48].

Based on our study and feedback from general practitioners, the TYM-Hun seems to be a viable, user- and staff-friendly screening test for detecting MCI and dementia in general practice. Summarizing the subjective feedback, we can say that the general practitioners reported that: it is good to inform the client about the test results so that they can be included in the examination more easily; older age can often lead to a loss of visual acuity, and since TYM-Hun is self-administered, it is recommended that the patient bring glasses to the office; it is recommended to use a clipboard when filling out the test, and for the staff to turn the sheet over so that we can prevent the patient from turning the page back; the test was found to be sufficiently sensitive, as it examines several subdomains. Therefore, we recommend the test for everyday use in the case of people who report or show signs of the possibility of cognitive decline, and also to keep in mind these family doctor's observations during use.

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