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# Knowledge of general practitioners on dementia and mild cognitive impairment: a cross-sectional, questionnaire study from Hungary

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**ABSTRACT**

General practitioners (GPs) play a pivotal role in dementia recognition, yet research suggests that dementia often remains undetected in primary care. Lack of knowledge might be a major contributing factor to low recognition rates. Our objective was to address a gap in the scientific literature by exploring GPs' knowledge on dementia and mild cognitive impairment (MCI) for the first time in Hungary by conducting a cross-sectional, questionnaire study among practicing GPs. Recruitment of the participants ($n$ = 402) took place at mandatory postgraduate training courses and at national GP-conferences; the applied questionnaire was self-administered and contained both open-ended and fixed-response questions.

Results showed that GPs highlighted vascular and metabolic factors (38.3% of the answer items) and unhealthy lifestyle (29.1% of the answer items) as dementia risk factors. They perceived vascular dementia as the most common dementia form, followed by Alzheimer's disease. Almost half of the respondents (44.9%) were not familiar with MCI. Most GPs identified memory problems (98.4%) and personality change (83.2%) as the leading symptoms of dementia.

In summary, GPs demonstrated adequate knowledge on areas more relevant to their practices and scope of duties (risk and preventive factors, main types and symptoms of dementia); however, uncertainties were uncovered regarding epidemiology, MCI, and pharmacological therapy. As only one-fifth (19.4%) of the GPs could participate recently in dementia-focused trainings, continued education might be beneficial to improve dementia detection rates in primary care.

## Background

Dementia (or major neurocognitive disorder) is a usually progressive clinical syndrome that encompasses deterioration of memory, thinking, learning, language, orientation, and behavior (American Psychiatric Association, 2013; World Health Organization, 2012). The deficits may interfere with patients' independence and affect their overall quality of life, challenging not only the families involved, but also imposing a huge economic burden on the health-care system (Wimo, Jönsson, Bond, Prince, & Winblad, 2013). Dementia currently affects about 6% of the population over the age of 60 in Europe, and the number is increasing rapidly with 4.6 million new cases every year worldwide (Ferri et al., 2005; Prince, Wimo, & Guerchet, 2015). In Hungary, the number of residents over the age of 65 has increased

by more than 15% during the past decade, which is today about 1,890,000 people (19% of the whole population) (Hungarian Central Statistical Office, n.d.b). As the incidence of dementia is substantially increased among the elderly (Jorm & Jolley, 1998), the number of dementia cases is expected to rise in the following years similar to other countries with aging populations.

General practitioners (GPs) play a substantial role in the recognition of dementia, as they can monitor patients' somatic risk factors or notice changes in their cognitive performance. According to a multinational survey, the majority of dementia patients and family members seek an initial examination from their GPs (Wilkinson, Stave, Keohane, & Vincenzino, 2004). However, studies have shown worldwide that a significant percentage of dementia cases are not detected in primary care, leaving patients without a chance to be referred to specialists and thus without access to early, proper treatment (Connolly, Gaehl, Martin, Morris, & Purandare, 2011; Ólafsdóttir, Skoog, & Marcusson, 2000; Pentzek et al., 2009a). This notion is supported by a review, which states that 50% to 66% of all dementia cases in the analyzed primary care samples had not received an official dementia diagnosis (Boustani, Peterson, Hanson, Harris, & Lohr, 2003). Missed or delayed diagnosis not only hinders opportunities for early therapy but also results in failure to identify and treat dementias of possibly reversible etiologies. Besides negatively affecting the patients, it can also increase the caregivers' burden by delaying the organization of support for the family (Bradford, Kunik, Schulz, Williams, & Singh, 2009). Early and accurate diagnosis, however, requires a number of factors (Koch & Iliffe, 2010), including enough time for patient consultations, suitable conditions for performing cognitive examinations, and naturally, adequate knowledge on dementia from GPs.

Lack of knowledge on dementia was found to be one of the major contributing factors to the worldwide trends of underdiagnoses (Bradford et al., 2009). Knowledge affects the success of dementia detection in primary care via direct and indirect ways. Misinformation about the normal changes in aging makes it difficult for GPs to distinguish between natural and pathological symptoms (Iliffe, Manthorpe, & Eden, 2003), which can also keep them from pursuing efficient and pro-active screening or case-finding. Perceived and actual lack of knowledge might also impose a negative influence on GPs' confidence in their ability to recognize dementia, that might result in reluctance to make a diagnosis or perform cognitive examinations (Bradford et al., 2009).

GPs' knowledge has previously showed great variance even within the same survey: correct answer rates on a dementia quiz in Germany ranged between 12% and 90% (Pentzek et al., 2009b) and British GPs' scores fluctuated in a similar manner (between 11% and 96%) on different dementia-related topics (Turner et al., 2004). Other works reported alarming performances: an English study revealed that more than half of the respondent GPs scored a maximum of 2 on a 10-item dementia quiz (Ahmad, Orrell, Iliffe, & Gracie, 2010); similarly, Nepalese GPs filled out a similar quiz with a 25% average correct response rate (Pathak & Montgomery, 2015). In addition to objective test results, GPs themselves often do not feel well-informed enough and thus confident in their diagnostic skills (Ahmad et al., 2010; Pathak & Montgomery, 2015; Turner et al., 2004; Veneziani et al., 2016).

Research of GPs' knowledge regarding dementia is still rather scarce in the scientific literature, with little or no empirical data from the East-Central European region. For the first time in Hungary, our aim was to gain more insight into GPs' knowledge by exploring their awareness of the preventive and risk factors, different types, symptoms and the pharmacological treatment of dementia.

## Methods

### Questionnaire

The present study formed part of an extensive research project among Hungarian GPs, examining GPs' role in several aspects of dementia detection and care. For this purpose, a self-administered questionnaire was designed by expert panels (including the authors JK, MP, EP, and SZH), including a section dedicated to exploring the factual knowledge of GPs on dementia by implementing 8 fixed-response (single/multiple choice), 4 open-ended questions, and 1 ranking task. These questions pertained to the

Table 1. List of the applied questions and question types.

| Question type | Subject |
|---|---|
| Demographic questions | Characteristics of GPs and their practices |
| Open-ended questions | Risk factors for dementia |
| | Preventive methods for dementia |
| | Types of dementia |
| | Types of reversible dementia |
| Ranking task | Prevalence of different types of dementia |
| Fixed-response questions | Familiarity with mild cognitive impairment |
| | Symptoms of mild cognitive impairment* |
| | Symptoms of dementia* |
| | Anti-dementia medications for mild dementia* |
| | Anti-dementia medications for moderate dementia* |
| | Anti-dementia medications for severe dementia* |
| | Clinical effects of anti-dementia medications* |
| | Time needed to judge the efficacy of anti-dementia medications |

*multiple choice question

following topics: dementia risk factors and preventive methods; types and reversible forms of dementia; prevalence of different dementia forms; most frequent symptoms of dementia and mild cognitive impairment (MCI); and pharmacological therapy. (For the list of questions, see: Table 1.)

## Data collection

The questionnaires were distributed onsite at mandatory postgraduate training courses and at national GP-conferences within a 10-month time frame (in Hungary, GPs are obligated to participate in a postgraduate training course once in 5 years). These events were held in major cities of every region of the country and were selected to ensure that (1) they did not provide any lectures on dementia at the time, and that (2) GPs from all 19 counties of Hungary could be represented among the attendees. In total, 402 GPs volunteered to participate in the project by completing and handing back the questionnaire, which is more than 8% of all 4,850 GPs in Hungary (excluding GPs working with children) (Hungarian Central Statistical Office, n.d.a). Participation was voluntary and anonymous; GPs were informed about the aim of the project and did not receive any financial compensation. The study was conducted in compliance with the principles of the Declaration of Helsinki and was approved by the Regional and Institutional Research Ethics Committee of the University of Pécs, Hungary.

The numbers of valid answers varied with each question (mean completion rate: 78.9%); relevant numbers are indicated at the appropriate sections. Descriptive analysis was carried out on respondents' answers; in the case of the four open-ended questions, analysis was preceded by the coding and classification of the answers into categories established by the authors. Data were analyzed using the SPSS v.24 statistical analysis software (SPSS Inc., Chicago, IL, USA).

## Results

### Demographics and practice characteristics

In our sample, there were slightly more females (53.7%) than males. More than half of the respondents were over the age of 55 (56.7%) and have been practicing for more than 20 years (62.0%). Only one-fifth (19.4%) of GPs reported taking part in a dementia-focused training course or lecture on dementia in the past 2 years. Although the participants were not recruited representatively, the sample's demographics is comparable to that of the target group: Hungarian GPs also have a relatively equal gender split (with 51% males) and the majority (approximately 72%) are above the age of 55 (Hungarian National Healthcare Service Center, 2015). Characteristics of practices and demographic information are detailed in Table 2.

**Table 2.** General practitioners' demographics and practice characteristics.

| Characteristics | Options | % |
|---|---|---|
| Gender ($n = 387$) | male | 46.3% |
| | female | 53.7% |
| Age ($n = 393$) | 25–35 | 5.9% |
| | 36–45 | 12.5% |
| | 46–55 | 24.9% |
| | 56–65 | 40.2% |
| | 65+ | 16.5% |
| Years in GP practice ($n = 390$) | 0–10 | 19.2% |
| | 11–20 | 18.7% |
| | 21–30 | 31.8% |
| | 31–40 | 21.0% |
| | 40+ | 9.2% |
| Number of dementia patients ($n = 383$) | 0–50 | 49.9% |
| | 51–100 | 38.1% |
| | 101–150 | 8.4% |
| | 151–200 | 2.6% |
| | 200+ | 1.0% |
| Place of practice ($n = 372$) | urban | 66.1% |
| | rural | 33.9% |
| Dementia training (last two years) ($n = 366$) | yes | 19.4% |
| | no | 80.6% |

## Dementia risk factors and preventive methods

Four open-ended questions were administered to examine Hungarian GPs' basic knowledge on dementia. First, GPs were asked to list risk factors for dementia (Table 3). Out of the 700 answer items ($n = 209$; item/respondent: $M = 3.35$; $SD = 1.531$), 5 main categories emerged. More than one-third of all items belonged to the category of (1) vascular and metabolic factors (38.3%) (e.g. cerebro-cardiovascular diseases, hypertension, diabetes mellitus, hyperlipidemia, metabolic disturbances or stroke), followed by (2) lifestyle and health-care factors (29.1%) (e.g. alcohol/drug use, smoking, unhealthy diet/obesity, physical and cognitive inactivity, stress or improper medication), then (3) social and psychological factors (12.1%) (e.g. isolation or depression), (4) genetic factors (10.3%) (e.g. familial occurrence of dementia) and finally (5) demographic predispositions (10.1%) (e.g. old age, low education or sex/gender).

**Table 3.** General practitioners' perception of risk factors for dementia (organized into categories).

| Main categories | Vascular and metabolic factors | Lifestyle and health care factors | Social and psychological factors | Genetic factors | Demographic predispositions |
|---|---|---|---|---|---|
| Examples | • Cerebro-cardiovascular diseases<br>• Hypertension<br>• Diabetes mellitus<br>• Hyperlipidemia<br>• Metabolic disturbances<br>• Stroke | • Alcohol or drug abuse<br>• Smoking<br>• Cognitive inactivity<br>• Unhealthy diet<br>• Obesity<br>• Physical inactivity<br>• Stressful lifestyle<br>• Improper medication | • Social isolation<br>• Depression | • Familial occurrence of dementia | • Old age<br>• Low education<br>• Sex/Gender |
| Respondents | | | $n = 209$ | | |
| Total response items | | | 700 | | |
| Item/category | 269 (38.3%) | 204 (29.1%) | 85 (12.1%) | 72 (10.3%) | 71 (10.1%) |

In addition to risk factors, GPs were also asked to gather possible preventive methods for dementia. In total, 353 answer items were given ($n = 152$; item/respondent: $M = 2.32$; $SD = 1.412$), which could be grouped into four sections. More than half of the items concerned (1) healthy lifestyle (58.4%) (e.g. cognitive and physical activity, healthy diet, avoidance of alcohol or drugs and smoking). GPs also mentioned the importance of (2) proper medical care (15.3%) (e.g. early case-finding, regular medical checkups or adequate therapy), (3) prevention/treatment of somatic diseases (14.2%) (e.g. treatment of cerebro-cardiovascular diseases, hypertension or diabetes mellitus), and (4) improvement of psychosocial factors (12.2%) (e.g. active social life, supporting familial background or stimulating environment).

## Types of dementia and reversible forms

In the following open-ended question, GPs were requested to list dementia types. From the total of 933 answer items ($n = 267$; item/respondent: $M = 3.49$; $SD = 1.595$), five groups of dementia types could be distinguished: almost half of the answers belonged to (1) primary neurodegenerative diseases (45.0%) (e.g. Alzheimer's disease (AD), Parkinson's disease, Huntington's disease, frontotemporal dementia (e.g. Pick's disease) or dementia with Lewy bodies (DLB)), followed by (2) vascular dementia diseases (29.4%) (e.g. vascular dementia (VD) or post-stroke dementia), (3) secondary dementia diseases (18.1%) (e.g. associated with inflammations or infections, intoxications, or with somatic diseases), (4) mixed dementia diseases (4.6%), and (5) other miscellaneous disorders (2.9%) (e.g. cognitive impairments in affective disorders or MCI) (Table 4).

In a similar manner, participants also listed reversible dementia types. Altogether 243 answer items were given ($n = 126$; item/respondent: $M = 1.93$; $SD = 1.291$), almost half of them in the category of (1) secondary dementia diseases (48.1%) (e.g. dementias associated with toxic/infectious causes), one-fifth among (2) dementia diseases with a vascular origin (22.2%) (e.g. post-stroke or VD) or (3) cognitive impairments in affective disorders (19.3%); and only a minor percentage of answer items belonged to the category of (4) primary neurodegenerative diseases (9.1%) (e.g. Parkinson's disease) or to (5) mixed dementias (1.2%).

Table 4. General practitioners' perception of types of dementia (organized into categories).

| Main categories | Primary neurodegenerative diseases | Vascular dementia diseases | Secondary dementia diseases | Mixed dementia diseases | Miscellaneous |
|---|---|---|---|---|---|
| *Examples* | • Alzheimer's disease<br>• Parkinson's disease<br>• Huntington's disease<br>• Frontotemporal dementia (e.g. Pick's disease)<br>• Dementia with Lewy bodies<br>• Other genetic origin | • Vascular dementia (e.g. multi-infarct dementia)<br>• Post-stroke dementia | • Infections/inflammations (e.g. Creutzfeldt-Jakob disease)<br>• Intoxications (e.g. alcohol, drugs)<br>• Traumas<br>• Secondary dementias associated with somatic diseases<br>• Other secondary dementias | • Mixed type dementias | • Cognitive impairments in affective disorders<br>• Mild Cognitive Impairment |
| *Respondents* | | | $n = 267$ | | |
| *Total response items* | | | 933 | | |
| *Item/category* | 420 (45.0%) | 274 (29.4%) | 169 (18.1%) | 43 (4.6%) | 27 (2.9%) |

### Prevalence of different dementia types and conditions associated with dementia

To investigate how Hungarian GPs perceive the frequency of dementia forms and other neurodegenerative conditions associated with dementia, respondents ($n = 235$) were requested to rank nine types, beginning with the most common one. Regarding the three most common distinct types of dementia, results showed that GPs perceived VD as the leading form, followed by AD, while DLB was ranked as the seventh (detailed results are provided in Table 5).

### Symptoms of mild cognitive impairment and dementia

Fixed-response questions were administered to explore more specific knowledge on dementia and its common prodromal syndrome. MCI does not interfere significantly with daily activities but is associated with an increased risk of developing dementia. However, almost half (44.9%; $n = 157$) of all respondent GPs reported that they did not know MCI. When asked to mark one or more symptoms of MCI from a list of 7 items, GPs marked the answers with the following percentages: concentration deficit (70.5%; $n = 256$), subjective memory complaints (63.1%; $n = 229$), deficits in daily routine activities (59.8%; $n = 217$), learning deficit (56.2%; $n = 204$), decreased judgment (22.0%; $n = 80$), decreased self-reliance (14.3%; $n = 52$), and severe social dysfunctions (10.2%; $n = 37$).

Regarding recognition of dementia, GPs were asked to mark one or more symptoms (from a list of 9 items) that they considered indicative of dementia. The percentages of respondents who marked each answer were the following (in descending order): memory impairment (98.4%; $n = 363$), personality change (83.2%; $n = 307$), depression (64.2%; $n = 237$), sleeping disorder (57.5%; $n = 212$), aggression (37.7%; $n = 139$), delusion (33.1%; $n = 122$), hallucination (31.2%; $n = 115$), apraxia (27.1%; $n = 100$) and delirium (12.7%; $n = 47$). The higher percentages indicate the more GPs believing that the named symptom accompanies dementia.

### Pharmacological therapy of dementia

GPs were also inquired about different anti-dementia medications. When presented with three different stages of dementia (mild, moderate and severe), GPs had to choose which group(s) of medications they recommended for each from a list of three: glutamergic agents, acetylcholinesterase inhibitors and cognition-enhancing supplements (including nootropics, vasoactive- or ginkgo-containing agents and vitamin E). Cognition-enhancing supplements were recommended by a high percentage of GPs in the mild stage, but their role decreased with the severity of dementia. Complementarily, recommendations of acetylcholinesterase inhibitors and glutamergic agents increased in moderate and especially in severe dementia (detailed results are provided in Table 6).

Table 5. General practitioners' ranking of different dementia types based on their prevalence.

| Ranking based on GPs' answers | M ($n = 235$) | SD | Ranking based on prevalence studies [+] |
|---|---|---|---|
| 1. Vascular dementia* | 1.2 | 0.51 | 2. |
| 2. Alzheimer's disease* | 2.9 | 1.29 | 1. |
| 3. Mixed dementia | 3.3 | 1.30 | 3. |
| 4. Parkinson's disease | 3.6 | 1.47 | 5. |
| 5. Frontotemporal dementia | 4.8 | 1.34 | 6. |
| 6. Pick's disease | 6.7 | 1.22 | 7. |
| 7. Dementia with Lewy bodies* | 6.8 | 1.68 | 4. |
| 8. Creutzfeldt-Jakob disease* | 7.7 | 1.21 | 9. |
| 9. Huntington's disease* | 7.8 | 1.26 | 8. |

M, SD: mean and standard deviation of rank values; *changes of relative order compared to correct ranking;
[+] (Burns & Iliffe, 2009; National Institute of Neurological Disorders and Stroke, 2018; Onyike & Diehl-Schmid, 2013; Rawlins et al., 2016; Tysnes & Storstein, 2017).

**Table 6.** General practitioners' recommendations of anti-dementia medications in different dementia stages.

| | cognition-enhancing supplements | acetylcholinesterase inhibitors | glutamergic agents |
|---|---|---|---|
| mild* (n = 351) | 96.3% | 7.1% | 2.3% |
| moderate* (n =293) | 63.5% | 35.8% | 20.8% |
| severe* (n= 262) | 42.0% | 35.1% | 42.4% |

* multiple choice question; percentages do not add up to 100%.

Regarding the clinical efficacy of the anti-dementia medications available in Hungary, the majority of GPs (74.9%; $n = 286$) agreed that adequate pharmacological treatment can slow down disease progression; more than one-third (39.0%; $n = 149$) believed that these medications can reduce dementia symptoms, while only very few (3.1%; $n = 12$) thought that they can temporarily stop progression or completely eliminate the underlying cause of dementia (0.8%; $n = 3$). The majority of respondent GPs held the view that a minimum of 3 months (62.7%; $n = 235$) is needed to judge the efficacy of the chosen medical treatment in dementia, rather than a minimum of 1 month (3.5%; $n = 13$), 18 months (21.6%; $n = 81$) or 24 months (12.3%; $n = 46$).

## Discussion

### Main findings

The aim of the present study was to gather data for the first time about Hungarian GPs' knowledge on the different aspects of dementia and its prodromal stage, MCI. GPs demonstrated sufficient awareness of areas like risk and preventive factors of dementia, as well as main dementia types and leading symptoms; however, uncertainties were revealed regarding epidemiology, awareness of MCI, and also the use of medications in the different stages of dementia. A small fraction of the sample had attended a lecture about dementia or had participated in a dementia-focused training in the past 2 years.

### Interpretation of the results

Findings of the present study indicated that respondent Hungarian GPs were in possession of sufficient information about the major characteristics of dementia. Regarding open-ended questions (which had not been used previously in similar studies), GPs demonstrated awareness of a wide range of risk factors and preventive methods, especially lifestyle choices that strongly affect VD and are associated with the clinical expression of AD (Rosendorff, Beeri, & Silverman, 2007), and could list the major types of dementia. GPs chose memory problems as the leading symptom (which was also perceived as a key symptom in a Maltese GP-study (Caruana-Pulpan & Scerri, 2014)); and it coincides with the finding that the first doctor's appointment of patients later diagnosed with dementia is usually prompted by forgetfulness (Wilkinson et al., 2004).

An unanticipated result was that almost half of the respondents in our study reported that they were not familiar with the concept of MCI. Regarding its symptoms, the two most frequently chosen items were indeed signature signs of MCI, but a considerable percentage of GPs associated even some of the dementia-indicating symptoms with the condition. In view of GPs' self-reported unawareness, their answers do not imply either confident knowledge on the topic or an early detection-focused approach. Low awareness and detection difficulties of MCI were reported in Israel and Germany as well (Kaduszkiewicz et al., 2010; Werner, Heinik, & Kitai, 2013). Since more than half of MCI cases transition to dementia within 5 years (Gauthier et al., 2006), uncertain knowledge on its prodromal syndrome foreshadows problems regarding the chances of early recognition.

Based on our results, an intriguing pattern of answers could be observed in the case of certain questions, which could be partially derived from local features and the division of tasks in dementia diagnosis and management in the Hungarian health-care system. Regarding the prevalence of different

dementia types, Hungarian GPs in our sample believed that VD was the most common form, instead of AD. While epidemiological knowledge has been showed to be problematic for GPs of other countries as well (e. g. Jacinto, Villas Boas, Mayoral, & Citero, 2016; Turner et al., 2004), the specific perceptions of Hungarian GPs may also have explanations stemming from a local epidemiological characteristic: although AD accounts for more than two-thirds of all dementia cases worldwide and is the leading form in Hungary as well, the prevalence of VD is estimated to be higher here compared to other countries (Takacs, Ungvari, & Gazdag, 2015). GPs also ranked DLB as a relatively rare disease, despite it being the third most frequent clear form of dementia following AD and VD (Burns & Iliffe, 2009). This might be partly attributable to the fact that in the ICD-10 (*10th Revision of the International Statistical Classification of Diseases and Related Health Problems;* World Health Organization, 2016) no official classification code can be assigned to DLB on patient records, making it appear to be less frequent and significant to GPs' practices. Furthermore, while awareness of the different subtypes of dementia and their epidemiology holds great significance in making a diagnosis, in Hungary, this process is not solely dependent on GPs. Identifying the subtype of dementia requires neuroimaging, which is usually initiated by specialists (neurologists or psychiatrists) and evaluated by multidisciplinary teams.

Specifications and features of the health-care system offer another angle on the questions regarding pharmacological therapy as well. GPs' practices are regulated and often limited by local rules and guidelines: in many European countries (including Hungary) GPs officially do not have the right to prescribe cholinesterase inhibitors or glutamergic agents (Petrazzuoli et al., 2017). Furthermore, tailoring the medication to specific cases often relies on the expertise and equipment of secondary care: in our study, several Hungarian GPs also supported this notion by adding in free comments that deciding on medication is a task for specialists. With these in mind, respondents' answers in this study concerning pharmacological therapy were not inexplicable: cognition-enhancing supplements were recommended for all stages of the disease, even though their efficacy is only supported by evidence in certain types of dementia (O'Brien et al., 2017; Román, 2003). GPs in a Maltese national study also did not tailor pharmacological therapy to dementia severity properly: one type of medication (acetylcholinesterase inhibitors) was mostly suggested by GPs to treat all stages of AD (Caruana-Pulpan & Scerri, 2014).

## *Implications for the future*

In our sample, only one-fifth (19.4%) of respondent GPs reported that they had attended a lecture about dementia or had participated in a dementia-focused training in the past 2 years. However, based on our findings, updating GPs' current knowledge would be beneficial in all areas (and crucial in the case of MCI). Since the range of clinical conditions that GPs encounter day by day might be too broad for maintaining high levels of personal knowledge and deep expertise in every area (Pucci et al., 2004), GPs should be supported by continuous education.

Besides putting more emphasis on dementia in medical school and specialty programs (during the years of residency and fellowship), another way of providing GPs with scientifically up-to-date information about dementia would be the organization of regular post-graduate trainings for them, tailored specifically to the needs and characteristics of primary care in the specific country. Many studies reported the benefits of such educational programs for GPs: some authors described the success of a 3-day long, skill-based program that increased GPs' use of screening instruments (Galvin, Meuser, & Morris, 2012); other training sessions resulted in higher numbers of correctly detected dementia patients (Rondeau et al., 2008); while practice-based workshops and an inbuilt support software in the medical records also significantly improved GPs' dementia detection rates (Downs et al., 2006). However, a systematic review raised questions about the efficacy of certain types of educational programs (Perry et al., 2011): it suggested that lectures alone do not increase adherence to dementia guidelines, but trainings that require active participation of GPs can actually improve detection rates – favorably combined with organizational incentives. Besides the obtainable (factual and practical) knowledge, another positive impact of such trainings would be GPs' increased feelings of competence and confidence regarding dementia,

which may improve their attitude toward case-finding, also positively affecting their diagnostic efficacy (Kaduszkiewicz, Wiese, & van Den Bussche, 2008).

In Hungary, organized education is mainly accessible for GPs through participation on post-graduate trainings (mandatory in every 5 years). These trainings however do not necessarily include lectures on dementia, even though such lectures have been reported to positively influence the attitudes of Hungarian GPs toward the management of their dementia patients (Heim et al., 2019). Regarding the effects of education on GPs' dementia knowledge, more focused and systematic studies would be needed in the future.

### Strengths and limitations

The greatest strength of the present study is its novelty in delivering new information from East-Central Europe since the existing scientific literature does not provide sufficient data on GPs' dementia knowledge from this region. Additionally, as opposed to previous studies, the questionnaire applied here was designed specifically to include question types (open-ended, ranking) that offer more insight into GPs' knowledge than true/false statements or simple quiz questions.

Potential limitations of the current study should be also considered when interpreting the results. Firstly, as participation was completely voluntary, results might represent the knowledge and views of a more well-informed and motivated sample of GPs. Secondly, since dementia is within the normal remit of GPs' field of competence, it needs to be considered that the reason behind missing responses to certain questions was actual lack of knowledge. Thirdly, as a drawback of the applied pen-and-paper format questionnaire, the number of responses varied throughout (and was below the total number of participants in every case), limiting the validity of the questions with less answers. And fourthly, although the ranking task and certain types of questions (e.g. open-ended) were consciously applied in order to obtain a deeper understanding about GPs' knowledge, since similar studies mostly included typically quiz-like questions, international comparisons could not be made in every case.

### Conclusions

Based on the authors' information, this was the first study targeting the knowledge of Hungarian GPs regarding dementia, adding to the currently scarce scientific literature on the topic in the East-Central European region. Respondents demonstrated adequate knowledge on areas that are possibly more relevant to GPs' practices and scope of duties (risk and preventive factors, main types and symptoms of dementia); however, uncertainties were also revealed (regarding mostly awareness of MCI, but also in knowledge on epidemiology and pharmacological therapy). To improve dementia detection, longer GP-patient consultation times, practical and clear dementia guidelines and the use of cognitive assessment instruments among elderly patients would be just as valuable and necessary as continued dementia education for GPs.

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