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Estimating dementia cases amongst migrants living in Europe

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Background and purpose: The phenomenon of dementia amongst migrants and ethnic minorities represents an emerging concern for European healthcare systems, posing additional challenges in terms of clinical approach, access to care and resource utilization. The aim of the present study was to estimate the cases of dementia amongst immigrant older subjects living in Europe and in each European country.

Methods: The estimated cases of dementia amongst older (i.e. 65+) migrants living in the European Union (EU-28) and European Free Trade Association member states were calculated by multiplying the number of migrants (obtained through the data provided by Eurostat) with the age- and sex-specific prevalence rates (derived by a recent meta-analysis).

Results: Overall, 6 507 360 older migrants lived in Europe in 2017. In addition, 1 204 671 migrants were registered in Germany in 2010. Nearly 475 000 dementia cases (329 028 women, 147 410 men) were estimated in this population by applying age- and sex-specific prevalence rates. When considering each European country, the number of estimated cases ranged from 108 (Iceland) to 119 161 (France). In parallel, the proportion of dementia cases occurring in migrants ranged from 0.9% (Czech Republic) to 51.2% (Liechtenstein).

Conclusions: The issue of dementia in migrants and ethnic minorities is emerging but already relevant for European healthcare systems. The magnitude of this phenomenon and its complexities reinforce the need for coordinated initiatives both at a national and continental level. These epidemiological data should ideally be integrated with those coming from 'real world' services in order to better calibrate these actions.

Introduction

The term 'migrant' refers to any person who is moving or has moved across an international border or within a State away from his/her habitual place of residence, regardless of the person's legal status, the causes and voluntary/involuntary nature of the movement, and the length of stay [1]. To date, international migrants (i.e. subjects born outside their current country of residence) account for 11.5% of the overall European population. Amongst these people, about 20 million individuals are from non-EU developing countries (source: Eurostat 2017, http://ec.europa.eu/eurostat). This immigrant population is steadily growing older, thus increasingly facing the burden of age-related pathological conditions. In particular, the phenomenon of dementia and cognitive disturbances in this heterogeneous group of subjects represents an emerging concern for European healthcare systems [2]. In fact, the occurrence of dementing illnesses in older migrants poses additional challenges for a number of reasons [2–5]. These individuals may have a limited

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knowledge of the host country's language and a low educational level [6], thus making cognitive testing less reliable and accurate [7]. The diagnostic approach is also hampered by the poor availability and implementation of instruments that are appropriate for cross-cultural assessment of cognitive skills and deficits [8–10]. Cultural, spiritual and economic barriers as well as healthcare inadequacies may postpone medical help-seeking for cognitive disturbances and result in a reduced access to treatments, resources and support [3,11–14]. All these aspects might assume a greater relevance amongst people migrating from disadvantaged countries and ethnic minority groups, due to low employment levels, limited social support and access to education, and lower socioeconomic status.

Based on these considerations, there is a growing consensus recognizing the need to promote targeted strategies and policies to tackle this novel public health issue [11]. A first, pivotal step in this direction should inevitably be represented by the estimation of its magnitude and relevance in order to better design and calibrate future actions and initiatives [15].

The aim of the present study was to estimate the cases of dementia amongst immigrant older subjects living in Europe and in each European country. More specifically, the focus was on the member states of the European Union (EU-28) and the European Free Trade Association (EFTA).

Methods

Older migrants in Europe

The number of migrants living in Europe, aged 65 years or older, was obtained through the data provided by the Statistical Office of the European Union, Eurostat (http://ec.europa.eu/eurostat/web/population-demography-migration-projections/population-data/database). Subjects living in a given European country but born abroad were operationally identified as 'migrants' for the present analysis, regardless of the length of stay and the causes for the migration [1]. Age- and sex-specific data were available for the 28 countries of the European Union plus the four countries of the EFTA (i.e. Iceland, Liechtenstein, Norway and Switzerland). All data were updated to 2017 except for Germany (last update in 2010). No information was available for Germany concerning the 80–84 year and 85–90 year age classes. Data were also abstracted concerning the country of birth of immigrant individuals, considering both geographical (i.e. continent and sub-continental region) and socioeconomic aspects (i.e. income, life expectancy, literacy, education) [16]. However, detailed information on the geographical area of the countries of origin was available only for the 38.3% of the total older immigrant population living in Europe.

Dementia prevalence rates

The age- and sex-specific prevalence estimates of dementia were derived by a recent meta-analysis [17] of population-based European studies adopting the *Diagnostic and Statistical Manual of Mental Disorders* – IV edition criteria [18] and meeting the highest standards of methodological quality according to the Alzheimer Disease International standardized scoring system [19]. Nine studies, accounting for 18 263 overall participants and 2137 dementia cases, were included.

Estimated dementia cases amongst migrants

The estimated cases of dementia amongst older migrants living in Europe, and in each of the 32 countries considered, were calculated by multiplying the number of migrants with the age- and sex-specific prevalence rates. For each of the considered countries,

Table 1 Estimated dementia cases amongst migrants living in Europe (EU-28 and EFTA) in 2017

	Men			Women		
Age	Prevalence (%)[a]	Migrants (*n*)[b]	Estimated cases (*n*)	Prevalence (%)[a]	Migrants (*n*)[b]	Estimated cases (*n*)
65–69	0.9	1 162 015	10 458	1.1	1 319 729	14 517
70–74	2.1	897 734	18 852	2.2	1 008 898	22 196
75–79	4.6	658 585	30 295	5.6	809 705	45 343
80–84[c]	9.0	394 775	35 530	13.3	569 123	75 693
85–89[c]	13.9	183 921	25 565	26.4	321 532	84 884
≥90	31.2	85 608	26 710	38.9	222 093	86 394
Total		3 382 638	147 410		4 251 080	329 028

[a]Age- and sex-specific prevalence rates were taken from reference [17]; [b]Source: Eurostat (http://ec.europa.eu/eurostat/web/population-demography-migration-projections/population-data/database); data are updated to 2017 except for Germany (2010); [c]No data were available for Germany concerning these specific age classes.

Table 2 Estimated dementia cases, by sex and age group, amongst migrants living in the 32 countries considered

Country	Belgium				Bulgaria				Czech Republic				Denmark			
	Men		Women		Men		Women		Men		Women		Men		Women	
Age	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC
65–69	41 241	371	42 763	470	2594	23	4224	46	6355	57	4786	53	9889	89	10 506	116
70–74	30 083	632	33 471	736	2044	43	2627	58	3052	64	2322	51	7523	158	7516	165
75–79	20 305	934	24 872	1393	1611	74	2935	164	1764	81	1792	100	4323	199	5392	302
80–84	11 809	1063	18 015	2396	1042	94	1816	242	838	75	1046	139	1992	179	3441	458
85–89	5949	827	12 140	3205	471	65	794	210	371	52	600	158	883	123	2066	545
>90	2366	738	7765	3021	156	49	347	135	193	60	424	165	324	101	1208	470
Total	111 753	4565	139 026	11 221	7918	348	12 743	855	12 573	390	10 970	667	24 934	849	30 129	2056

Country	Germany				Estonia				Ireland				Greece			
	Men		Women		Men		Women		Men		Women		Men		Women	
Age	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC
65–69	223 643	2013	214 538	2360	8790	79	13 751	151	11 337	102	11 238	124	19 170	173	27 875	307
70–74	179 584	3771	168 147	3699	4954	104	8622	190	8317	175	8807	194	11 448	240	16 749	368
75–79	101 502	4669	110 788	6204	6403	295	14 278	800	5395	248	5991	335	8034	370	12 037	674
80–84	58 143	5233	70 013	9312	3097	279	8790	1169	3378	304	4195	558	5431	489	8595	1143
85–89[a]	na	na	na	na	1710	238	5952	1571	1583	220	2493	658	3679	511	6140	1621
>90[a]	na	na	na	na	494	154	2346	913	708	221	1505	585	3857	1203	7339	2855
585 376	562 872	15 686	563 486	21 575	25 448	1148	53 739	4794	30 718	1270	34 229	2454	51 619	2986	78 735	6968

Country	Spain				France				Croatia				Italy			
	Men		Women		Men		Women		Men		Women		Men		Women	
Age	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC
65–69	88 006	792	103 922	1143	297 525	2678	292 587	3218	19 032	171	24 637	271	50 389	454	104 512	1150
70–74	65 404	1373	74 807	1646	224 958	4724	210 781	4637	14 149	297	18 166	400	28 477	598	58 718	1292
75–79	45 121	2076	49 630	2779	157 388	7240	156 447	8761	14 327	659	18 915	1059	20 884	961	37 371	2093
80–84	24 382	2194	28 174	3747	104 793	9431	124 299	16 532	8545	769	12 780	1700	13 916	1252	28 247	3757
85–89	12 640	1757	17 461	4610	57 383	7976	84 261	22 245	3013	419	5898	1557	7729	1074	20 012	5283
>90	6540	2040	10 641	4139	25 863	8069	60 794	23 649	793	247	2054	799	3159	986	12 221	4754
Total	242 093	10 233	284 635	18 064	867 910	40 119	929 169	79 042	59 859	2563	82 450	5786	124 554	5325	261 081	18 328

Country	Cyprus				Latvia				Lithuania				Luxembourg			
	Men		Women		Men		Women		Men		Women		Men		Women	
Age	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC
65–69	3543	32	3412	38	12 165	109	19 210	211	4621	42	7359	81	5929	53	5548	61
70–74	1896	40	1734	38	7674	161	13 890	306	2603	55	4679	103	3901	82	3704	81

(continued)

Table 2 *(Continued)*

Country	Cyprus				Latvia				Lithuania				Luxembourg			
	Men		Women		Men		Women		Men		Women		Men		Women	
Age	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC
75–79	992	46	997	56	9840	453	20 834	1167	3422	157	7484	419	2392	110	2976	167
80–84	370	33	689	92	4586	413	12 716	1691	1755	158	4577	609	1400	126	1969	262
85–89	185	26	477	126	2440	339	8016	2116	721	100	2373	626	636	88	1210	319
>90	71	22	260	101	744	232	3589	1396	118	37	724	282	212	66	651	253
Total	7057	199	7569	450	37 449	1707	78 255	6887	13 240	549	27 196	2120	14 470	526	16 058	1144

Country	Hungary				Malta				Netherlands				Austria			
	Men		Women		Men		Women		Men		Women		Men		Women	
Age	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC
65–69	10 210	92	12 460	137	1180	11	1117	12	48 391	436	53 215	585	31 592	284	36 746	404
70–74	9956	209	13 287	292	1030	22	899	20	31 984	672	33 146	729	24 790	521	30 830	678
75–79	6710	309	9977	559	583	27	507	28	25 679	1181	26 824	1502	19 054	876	24 456	1370
80–84	3894	350	7057	939	309	28	326	43	12 164	1095	16 329	2172	9522	857	14 377	1912
85–89	2095	291	4120	1088	127	18	200	53	5016	697	9884	2609	4695	653	8925	2356
>90	949	296	2608	1015	63	20	105	41	1731	540	6094	2371	1989	621	7431	2891
Total	33 814	1547	49 509	4029	3292	124	3154	197	124 965	4620	145 492	9968	91 642	3812	122 765	9611

Country	Poland				Portugal				Romania				Slovenia			
	Men		Women		Men		Women		Men		Women		Men		Women	
Age	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC
65–69	5625	51	8143	90	13 656	123	17 283	190	4171	38	4999	55	8490	76	7398	81
70–74	38 187	802	54 057	1189	8475	178	7198	158	5065	106	6732	148	5364	113	4954	109
75–79	35 404	1629	57 123	3199	4951	228	9567	536	4031	185	5690	319	4529	208	4055	227
80–84	24 470	2202	47 607	6332	3109	280	5266	700	2277	205	3713	494	2504	225	2782	370
85–89	15 744	2188	35 219	9298	1125	156	4327	1142	1047	146	1895	500	858	119	1468	388
>90	9150	2855	25 825	10 046	589	184	2148	836	752	235	1501	584	335	105	684	266
Total	128 580	9727	227 974	30 153	31 905	1149	45 789	3562	17 343	914	24 530	2100	22 080	847	21 341	1441

Country	Slovakia				Finland				Sweden				UK			
	Men		Women		Men		Women		Men		Women		Men		Women	
Age	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC
65–69	8134	73	10 083	111	3631	33	3833	42	38 405	346	44 143	486	128 424	1156	168 582	1854
70–74	4754	100	7231	159	2033	43	1853	41	29 686	623	31 932	703	95 751	2011	131 254	2888
75–79	3273	151	5484	307	1279	59	1784	100	22 712	1045	26 144	1464	90 577	4167	116 850	6544
80–84	1921	173	3875	515	673	61	1201	160	12 327	1109	19 254	2561	55 821	5024	84 490	11 237

(continued)

Table 2 *(Continued)*

Country	Slovakia				Finland				Sweden				UK			
	Men		Women		Men		Women		Men		Women		Men		Women	
Age	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC
85–89	947	132	2103	555	342	48	806	213	5827	810	12 498	3299	37 710	5242	50 013	13 203
>90	366	114	1038	404	132	41	445	173	2269	708	6442	2506	18 548	5787	45 887	17 850
Total	19 395	742	29 814	2051	8090	283	9922	728	111 226	4641	140 413	11 018	426 831	23 386	597 076	53 576
Region	Iceland				Liechtenstein				Norway				Switzerland			
	Men		Women		Men		Women		Men		Women		Men		Women	
Age	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC	Migr.	EDC
65–69	346	3	346	4	576	5	620	7	9691	87	8732	96	45 264	407	51 161	563
70–74	209	4	255	6	447	9	480	11	6421	135	6688	147	37 515	788	43 362	954
75–79	117	5	191	11	266	12	360	20	3051	140	4177	234	32 666	1503	43 777	2452
80–84	56	5	120	16	125	11	208	28	1621	146	2669	355	18 505	1665	30 487	4055
85–89	30	4	92	24	50	7	133	35	851	118	1782	470	8064	1121	18 174	4798
>90	18	6	52	20	25	8	96	37	348	109	1081	421	2746	857	8788	3419
Total	776	28	1056	81	1489	53	1897	138	21 983	735	25 129	1723	144 760	6341	195 749	16 239

EDC, estimated dementia cases; Migr., migrants. Source: Eurostat (http://ec.europa.eu/eurostat/web/population-demography-migration-projections/population-data/database). Data were updated to 2017 except for Germany (2010) [a]No data were available for Germany concerning these specific age classes.

the proportion of dementia cases occurring in migrants (calculated as the ratio between the estimated cases in migrants and in the overall population) was also estimated.

Results

Overall, 6 507 360 older migrants (women 55.7%) lived in Europe in 2017 (Table 1), with national estimates ranging widely from 1832 in Iceland to 1 797 079 in France (Table 2). In addition, 1 204 671 migrants were registered in Germany on 2010. The majority of immigrant subjects were born in another EU-28 or EFTA country. However, more than 2 million were first-generation immigrants from less and medium developed non-European countries. Based on available data, a relevant number of individuals came from outside the extended EU, Canada, USA, Australia and New Zealand, thus possibly composing ethnic minority groups once they moved to Europe [2].

Nearly 476 500 dementia cases (329 028 women, 147 410 men) were estimated in the over 65-year-old European immigrant population by applying age- and sex-specific prevalence rates (Table 1). When considering each European country, the number of estimated cases ranged from 108 (Iceland) to 119 161 (France) with a marked inter-national variability (median 5144; interquartile range 2134–15 691) (Table 2). The proportion of dementia cases occurring in migrants (i.e. the ratio between the estimated cases in migrants and

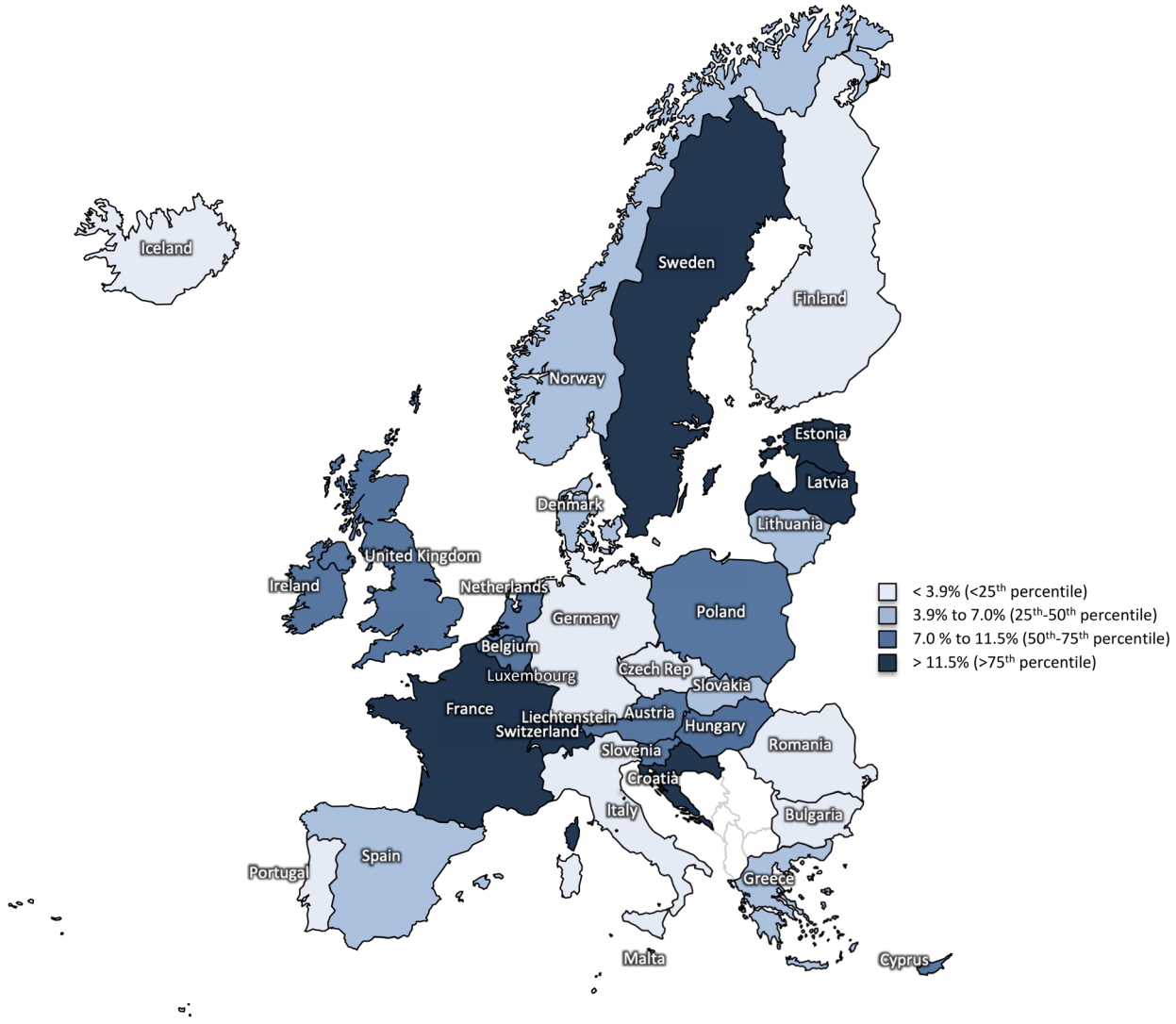

Figure 1 Proportion of dementia cases occurring in migrants in the 32 countries considered. [Colour figure can be viewed at wileyonlinelibrary.com]

in the overall population) ranged from 0.9% (Czech Republic) to 51.2% (Liechtenstein) (median 7.0%; interquartile range 3.9%–11.5%) (Fig. 1 and Table 3).

Discussion

To our knowledge, the present study constitutes the first attempt to describe and characterize the issue of dementia occurring in the immigrant population living in Europe. Based on our findings, a non-negligible number of migrants might seek or are already seeking help for cognitive disturbances, thus potentially referring to clinical and social services in their novel European country of residence, with relevant healthcare and societal implications. In particular, according to our estimates, nearly 6.5% of overall cases of dementia in Europe is expected to involve foreign-born populations (476 438 out of 7 279 151 total cases). It is noteworthy that, although this phenomenon is mostly involving subjects coming from other European states, a sizeable proportion of cases is probably affecting individuals migrating from low and middle income countries, thus probably with lower socioeconomic status, a different cultural background and reduced access to care. These numbers are projected to increase further in the next years in the light of the ongoing sociodemographic changes and the growing extent of migratory flows to Europe. Moreover, it is likely that the future implementation of nosological classifications incorporating also potential pre-dementia conditions (e.g. mild cognitive impairment) will further increase the dimension of the problem.

Table 3 Proportion of dementia cases occurring in migrants in the 32 countries considered

Country	Estimated cases in migrants (*n*)	Estimated cases in the overall population (*n*)	Estimated proportion of cases in migrants (%)
Liechtenstein	190	371	51.2
Estonia	5942	18 231	32.6
Latvia	8594	26 894	32.0
Luxembourg	1670	5874	28.4
Switzerland	22 580	109 437	20.6
Croatia	8348	51 950	16.1
France	119 161	1 005 787	11.8
Sweden	15 659	134 747	11.6
Austria	13 423	116 955	11.5
Belgium	15 786	156 704	10.1
Poland	39 880	412 267	9.7
UK	76 962	822 180	9.4
Ireland	3724	39 848	9.3
Cyprus	649	7600	8.5
Slovenia	2288	26 926	8.5
Netherlands	14 589	200 953	7.3
Lithuania	2668	39 511	6.8
Malta	322	5003	6.4
Slovakia	2794	47 212	5.9
Greece	9954	173 882	5.7
Hungary	5576	114 211	4.9
Denmark	2905	67 940	4.3
Norway	2458	59 380	4.1
Spain	28 297	697 404	4.1
Iceland	108	3126	3.5
Portugal	4711	155 879	3.0
Germany	37 261	1 237 249	3.0
Italy	23 653	1 045 718	2.3
Bulgaria	1203	85 346	1.4
Romania	3014	219 006	1.4
Finland	1012	76 305	1.3
Czech Republic	1056	115 255	0.9

Of course, these data should be combined with those coming from the 'real world' to achieve a better comprehension of this emerging phenomenon. To date, most of the available evidence on the topic has emerged by national registry based studies that have shown that, in some European countries (e.g. Norway, Denmark and Sweden), immigrants have a lower likelihood of receiving a diagnosis of dementia and anti-dementia treatment compared to their native counterparts [12,20,21]. Conversely, only few studies have attempted to characterize and explore the magnitude of this issue at the services level. A recent survey conducted in 15 European countries confirmed that memory clinics still have a limited experience with non-European migrants and ethnic minority groups. In particular, 80% of the centres reported to have <5% of non-western older subjects amongst the overall referred patients. Moreover, the clinical approach to these patients was considered to be challenging by nearly two-thirds of centres, mostly due to communication problems and lack of adequate assessment tools [2]. There is also sparse evidence that the number of subjects migrated from disadvantaged contexts attending dementia services is increasing. For example, in Belgium, the proportion of first-generation immigrants from non-EU countries referred to a university memory clinic increased from 6% to 16% between 2005 and 2012 [22]. Interestingly, these subjects exhibited different sociodemographic and phenotypic features (e.g. lower Mini-Mental State Examination scores and higher prevalence of psychiatric diagnoses) compared to native-born patients.

The present study has several limitations worth mentioning. First, the number of dementia cases amongst migrants was estimated without considering the possible differences in terms of dementia prevalence across different races and ethnicities. Some reports have in fact documented that cognitive disorders are more prevalent amongst non-western immigrants in Europe in general and, in particular, in

specific ethnic groups. For instance, a study conducted in the Netherlands revealed that mild cognitive impairment and dementia were three to four times more prevalent in most non-western immigrant groups (i.e. Turkish, Moroccan Arabic and Berber, Surinamese Hindustani) compared to the native-born Dutch population [23]. Along the same lines, a higher dementia prevalence was observed amongst people of African-Caribbean country of birth living in the UK compared with their native-born counterparts [24]. It should be noticed that both studies adopted culture-fair tools for detecting dementia, thus overcoming (or at least limiting) possible barriers associated with language, poor education and illiteracy. The observed excess of dementia in minority groups was hypothetically attributed to the higher prevalence of vascular risk factors and the lower socioeconomic status. Unfortunately, in Eurostat, detailed data on the countries of origin were available only for a minority of migrants. This was not conducive to performing additional analyses accounting for the different prevalence rates of dementia across world countries/regions. Secondly, the lack of updated data for Germany, one of the main destinations of migrations in Europe, significantly underestimates our findings. In fact, nearly 96 500 cases of dementia amongst foreign-born subjects have been estimated in this country by considering more recent data (i.e. almost 60 000 more cases than our estimates) [25]. Finally, additional determinants (e.g. life expectancy, education, comorbidities, lifestyle, cognitive reserve, socioeconomic status) that may significantly affect the risk of dementia (and thus the precision of the estimates of dementia cases) amongst migrants were not considered. In particular, vascular risk factors, depression, low educational levels and physical inactivity have all been consistently associated with an increased risk of dementia [26].

In conclusion, the present findings indicate that dementia in migrants and ethnic minorities constitutes an emerging but already relevant issue for European healthcare systems. The magnitude of this phenomenon and its complexities reinforce the need for coordinated initiatives at both a national and continental level. The epidemiological data provided should be integrated with those coming from 'real world' services in order to better calibrate these actions. In this context, the 'Dementia in immigrants and ethnic minorities living in Italy' project was recently funded by the Italian Ministry of Health in order to explore the public health relevance of dementia in the immigrant population living in Italy. This project should ideally be coordinated with similar initiatives in order to address this novel issue from an essential continental perspective.

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Disclosure of conflicts of interest

The authors have no conflicts of interest to disclose for the present study.

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