Prevalence of dementia and cognitive impairment with no dementia in a primary care setting in southern Brazil

Prevalência de demência e declínio cognitivo sem demência em contexto de atenção primária no sul do Brasil

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ABSTRACT

Background: Cognitive decline is a common condition, but is still underrepresented in studies conducted in developing countries. **Objective:** To calculate the prevalence of cognitive decline and depression in an elderly community-dwelling population in a city in southern Brazil. **Methods:** We calculated the prevalences of dementia, cognitive impairment with no dementia (CIND) and symptoms of depression in an elderly population relying on the public healthcare system. This epidemiological study in Pelotas, Brazil, was conducted within the primary care setting. It included 299 older adults (mean age = 69.75 ± 7.6 years) who presented low levels of education (mean = 4.16 ± 3.17 years of education). They underwent cognitive screening and their medical records were analyzed. **Results:** Among these older adults, 142 (47.5%) presented cognitive decline: 104 (34.8%) matching the cognitive criteria for CIND and 38 (12.7%) matching the cognitive criteria for dementia. Among all the individuals who completed the cognitive screening, 141 (48.4%) were positive for symptoms of depression, of whom 99 (34%) did not have any previous diagnosis in their medical records. **Conclusion:** There was high prevalence of cognitive impairment among these older adults in a primary care setting. A large number of older adults were found to have symptoms of depression without any diagnosis.

Keywords: Dementia; Public health; Depression; Cognitive decline; Alzheimer's disease.

RESUMO

Introdução: Declínio cognitivo é uma condição prevalente, apesar de ainda pouco representada em estudos de países em desenvolvimento. **Objetivo:** Calcular a prevalência de declínio cognitivo e depressão de uma população de idosos de uma cidade do Sul do Brasil. **Métodos:** Nós calculamos a prevalência de demência, declínio cognitivo sem demência (DCSD) e sintomas de depressão de uma população idosa de uma cidade assistida pelo sistema público de saúde. Um estudo epidemiológico foi conduzido em Pelotas, Brasil, no contexto de atenção primária incluindo 299 idosos (idade média = 69.75±7.6 anos), apresentando baixo nível educacional (média de anos de educação = 4.16±3.17). Esses indivíduos realizaram teste de rastreio cognitivo, e seus prontuários foram analisados. **Resultados:** Um total de 142 (47.5%) idosos apresentaram declínio cognitivo, dos quais 104 (34.8%) destes indivíduos atenderam a critérios cognitivos de DCSD e 38 (12.7%) indivíduos atenderam a critérios cognitivos para demência. Dentre todos indivíduos que completaram o rastreio, 141 (48.4%)

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foram positivos para sintomas de depressão, enquanto 99 (34%) não tinham diagnóstico em seus prontuários. **Conclusão**: Em suma, nós descrevemos uma prevalência alta de deterioro cognitivo entre idosos em um estudo de atenção primária. Nós também achamos um grande número de idosos com sintomas de depressão sem diagnóstico.

Palavras-chave: Demência; Saúde pública; Depressão; Declínio cognitivo; Doença de Alzheimer.

INTRODUCTION

With increasing life expectancy worldwide, epidemiological data about dementia is becoming very important in order to address this challenging situation. In this context, few studies have described the prevalence and incidence of cognitive disorders in developing countries like Brazil[1,2]. In a recent study, it was estimated that 77% of individuals with dementia in Brazil had not been properly diagnosed[3], which would give rise to a massive public health problem. Indirectly, the cost of dementia will create a significant economic burden for the Brazilian care and social security systems, with an estimated cost per patient of 16,000 dollars annually[4].

Recent advances in neurology and cognitive disorders have contributed to a redefinition of cognitive decline as a continuum, in which clinical manifestations occur at advanced stages. Pathological cognitive decline, initially in the form of mild Cognitive impairment (MCI) or even cognitive impairment with no dementia (CIND), is manifested mostly in the elderly population. Patients with CIND can be characterized as those who demonstrate cognitive impairment without significant impact on their daily activities[5], but who do not match the cognitive criteria for MCI[6]. The cornerstone of the definition of dementia is that it involves significant impairment of individual's activities of daily living[7,8]. However, cognitive impairment may be the chief complaint in patients with depression. Mood disorders are highly prevalent among older adults[9], and these also have a significant impact on quality of life and functional autonomy among the elderly[10].

It is well known that cognitive impairment is generally underdiagnosed within the primary care system. These patients with cognitive impairment will not receive adequate treatment in the early stages of dementia, which will result in a faster pace of pathological progression and poorer quality of life[11]. It has been estimated that about two thirds of dementia patients are not diagnosed at this first contact in developed countries[12] and in even greater proportions in developing country settings[3]. The lack of training of general practitioners with regard to diagnosing cognitive impairment and, especially, the lack of awareness of this condition in general population are major contributors to underdiagnosis of dementia[13]. Even in the tertiary-level care setting, cognitive decline has been demonstrated to be underdiagnosed[14].

Primary care physicians have a key position in the healthcare system. These professionals can identify the first signs of cognitive decline, which ultimately leads to early intervention and better quality of life[12]. In addition, many public policy proposals end up lacking information on the prevalence and incidence of dementia in society[15]. Although the importance of investigating the prevalence of dementia in a community has been recognized, only a few studies are generally available in developing countries[16]. Furthermore, there is a lack of consensus on the impact of dementia on the elderly populations of developing countries[17,18]. Therefore, the aim of this study was to calculate the prevalence of cognitive decline and depression in an elderly community-dwelling population relying on the public healthcare system, in Pelotas, a city in southern Brazil.

METHODS

A cross-sectional study was conducted in a primary care facility from April 2017 to August 2017, in Pelotas, a city located in the state of Rio Grande do Sul, the southernmost state of Brazil. This city has a population of 344,385 inhabitants, and 14.4% of them are estimated elderly[19]. The participants included in this study were community-dwelling residents in an area covered by the primary care system (Sistema Único de Saúde, *SUS*), comprising approximately 5000 people in total and, thus, an estimated 685 elderly people. All individuals who attended a consultation in this facility for any reason within the abovementioned timeframe and who were over 60 years old were invited to participate in this study. Since this was a study to estimate neuropsychiatric symptoms in a sample covered by the public healthcare system, we did not exclude any individual because of their diagnosis. Thus, individuals who attended the primary care setting were included without any restriction, provided that they signed an informed consent statement, as previously approved by the ethics committee of the Federal University of Pelotas.

All participants in the study underwent a clinical and neurological examination, at which sociodemographic and medical history data were also gathered, followed by cognitive screening. The latter included the mini-mental state examination (MMSE)[20], the Clinical Dementia Rating (CDR)[21], the Memory Assessment Complaint Questionnaire (MAC-Q)[22] and the Geriatric Depression Scale reduced

(GDS-15)[23]. Individuals were deemed to be positive for symptoms of depression if they presented a GDS score above 5. Their medical records were also analyzed to extract information about previous pathological conditions and previous use of medications.

Many approaches for defining cognitive impairment have been proposed [24]. In the present study, individuals were classified into three groups according to their cognitive scores and other criteria, as follows. Individuals were included in the cognitively normal (CN) group if they presented MMSE scores higher than the normative values for age and education[25], and if they also presented CDR scores of zero. Individuals were included in the CIND group if they presented MMSE scores lower than the normative values for age and education, and if they also presented CDR scores of 0.5 or zero. Individuals were included in the dementia group if they presented MMSE scores lower than the normative values for age and education, and if they also presented CDR scores higher than 0.5.

Descriptive analysis was performed to characterize the sample and calculate the prevalences of cognitive decline, CIND and dementia in this sample. Quantitative data were presented through calculation of proportions. For numerical variables, the mean and standard deviation were calculated. Wald's test was used for ascertain heterogeneity and linear trends. Pearson's correlation was performed and group comparisons were made with parametric tests and Tukey's post-hoc test. The Stata software was used (v12.0, StataCorp LP, College Station, Texas, USA). Associations with $p \leq 0.05$ were considered significant.

RESULTS

Out of the total of 685 older adults who had been estimated to live in the study area, 347 individuals over 60 years of age sought the primary care facility during the study period. Among these 347 eligible subjects, a total of 46 individuals (13.3%) were not interviewed at the time of their consultation and were not found through an active search and two individuals (0.6%) did not agree to participate. These proportions of individuals were representative of community-dwelling older adults in previous descriptions.

Our sample thus consisted of 299 individuals (44% of all older adults estimated to live in the area) who agreed to undergo the study protocol. Their mean age was 69.75 ± 7.6 years and 4.16 ± 3.17 years of education (Table 1). Importantly, 51 individuals (17.1%) were illiterate and 56 (18.7%) reported that they could not read although they had previously gone to school. The whole sample included 203 women (67.8%), and 157 patients (52.5%) were in the CN group.

We identified that a total of 142 of these older adults (47.49%) presented cognitive decline, of whom 104 (34.8%) were in the CIND group and 38 (12.7%) were in the dementia group. Importantly, the individuals included in the dementia group were older than the individuals included in the CIND and CN groups (75.91 ± 10.44 vs. 69.33 ± 7.57 vs. 68.57 ± 6.03 respectively; p < 0.001). The total scores from the MMSE were significantly different higher in the CIND group than in the dementia group (22.11 ± 3.89 vs. 16.3 ± 4.94; p < 0.001). In addition, the total MMSE score showed a positive correlation

Table 1. Sociodemographic characteristics of the sample.

	CN (n = 157)	CIND (n = 104)	Dementia (n = 38)
Age, mean (SD)	68.57 (6.03)*	69.33 (7.57)*	75.91 (10.44)
60 – 69 years, n	95 (60.5%)	58 (55.8%)	11 (29%)
70 – 79 years, n	51 (32.5%)	33 (31.7%)	10 (26.3%)
80 years or over, n	11 (7%)	13 (12.5%)	17 (44.7%)
Years of education, mean (SD)	4.59 (3.28)*	4.13 (2.96)*	2.29 (2.55)
0 years, n	23 (14.6%)	12 (11.6%)	16 (42.2%)
1 – 3 years, n	27 (17.2%)	36 (34.6%)	5 (13.1%)
4 – 7 years, n	79 (50.3 %)	41 (39.4%)	12 (31.6%)
8 years or more, n	28 (17.9%)	15 (14.4%)	5 (13.1%)
Illiterate, n	20 (12.7%)	21 (20.2%)	15 (39.4%)
Women, n	99 (63%)	76 (73%)	27 (71%)
Living alone, n	27 (17.2%)	28 (26.9%)	8 (21%)
Psychiatric disease, n	39 (24.8%)	27 (25.9%)	12 (31.5%)
GDS-15, mean (SD)	4.7 (3.34)*	5.2 (3.44)*	7.66 (3.4)
Subjective memory decline (Yes), n	49 (31.2%)	27 (25.9%)	23 (60.5%)
MAC-Q, mean (SD)	4.38 (4.2)*	4.22 (4.0)*	8.1 (4.76)
MMSE, mean (SD)	26.97 (2.53)*	22.11 (3.89)*	16.3 (4.94)

CN: cognitively normal; CIND: cognitive impairment with no dementia; GDS-15: Geriatric Depression Scale – 15 item version; MAC-Q: Memory Assessment Questionnaire; MMSE: Mini-Mental State Examination; * p < 0.05 in relation to the dementia group.

with education for the whole sample ($r = 0.52$; $p < 0.05$). Individuals classified in the dementia group (8.1 ± 4.76) showed significantly increased MAC-Q scores than those of the CIND group (4.22 ± 4; $p < 0.001$) or the CN group (4.38± 4.2; $p < 0.001$), but no correlation was found between MAC-Q scores and MMSE or education ($p > 0.05$ for both).

Among all the study participants, eight subjects did not complete the GDS assessment due to clinical, functional or cognitive disability. Among the remaining 291 individuals, 141 (48.4%) showed GDS scores above 4, which represents positivity for symptoms of depression. A total of 113 participants (38.8%) scored between 5 and 10 in the GDS, and 28 (9.6%) scored above 11 in the GDS (Table 1), which represents severe symptoms of depression. The dementia group showed more symptoms of depression than did the CN group (7.66 ± 3.4 vs. 4.7 ± 3.34; $p < 0.001$) or the CIND group (5.2 ± 3.44; $p = 0.001$). There was a weak correlation between the total MMSE score and the GDS score ($r = -0.18$; $p = 0.002$). Altogether, almost a third of the whole sample (99 individuals) showed GDS scores above 5 but did not have a diagnosis of depression in their medical reports. However, 42 individuals showed GDS scores above 5 and had a diagnosis of major depression in their medical records, while 13 individuals had a diagnosis of major depression in their medical records, but they showed GDS score below 5 and were using medication for depression.

There were 33 individuals with CDR scores above 0.5, but only 8 were formally classified as presenting dementia, in their medical records. A linear regression model that included age, years of education and total GDS score as predictors of the CDR score was statistically significant ($R^2 = 0.12$; $p < 0.0001$). There was a large effect size for the associations between CDR and age, and between CDR and GDS score (Cohen's $d = 12.8$ and 1.9, respectively).

Among the entire sample, 109 (36.4%) of the patients had a medical diagnosis of a neuropsychiatric disorder in their medical records. Among these individuals, 56 (18.73%) were diagnosed with major depression, 23 (7.7%) with general anxiety disorder, 8 (2.67%) with Parkinson's disease, 8 (2.67%) with unspecified dementia, 6 (2%) with Alzheimer's disease, 5 (1.67%) with schizophrenia, 4 (1.33%) with insomnia, 4 (1.33%) with bipolar affective disorder and 1 (0.3%) with mild retardation.

A descriptive analysis on previous medical histories was conducted in order to clarify the characteristics of the sample. Regarding the presence of clinical comorbidities, 225 (75.3%) of the elderly subjects had a previous diagnosis of hypertension, 204 (68.2%) had diabetes mellitus, 149 (49.8%) had dyslipidemia and 39 (13%) had a history of stroke. In addition, 137 (45.8%) of all the subjects had smoked cigarettes and 4 (1.6%) had used some type of illicit drug. Regarding alcohol consumption, 219 (73.2%) of the elderly subjects did not use alcohol, 43 (14.4%) drank alcohol once a month, 21 (7%) did this 2-4 times a month, 4 (1.3%) did this 2-3 times a

week and 12 (4%) did this more than 4 times a week. A total of 181 (60.5%) of the elderly subjects did not use any type of psychotropic medication. Among the 118 (39.5%) who used this, 84 (28.1%) used antidepressants, 66 (22.1%) used benzodiazepines, 16 (5.4%) used anticonvulsants, 12 (4%) used antipsychotic drugs, 5 (1.7%) used antiparkinsonian drugs and 1 (0.3%) used lithium carbonate.

DISCUSSION

To our knowledge, this was the first study conducted to identify the epidemiological and sociodemographic characteristics of cognitive decline in a city in southern Brazil. The prevalence of all types of dementia was higher in our sample than the prevalence estimated for the whole country (12.7% vs. 7.6%)[15]. It has been estimated that the median proportion of older adults living with dementia in Latin America is 7.13%[15], which is higher than the global average predicted by the World Health Organization (WHO)[26]. Many studies have found different prevalences of MCI around the world, ranging from 6.1 to 85%[2,27].

In the present study, the prevalence of cognitive impairment with no dementia in the whole sample was higher than in previous Brazilian studies on CIND[28] (34.8% vs. 17.5%, respectively). Specifically, there was a trend towards stability in the prevalence of dementia from 60-69 years to 70-79 years (29% and 26.3% of all individuals with dementia, respectively). This stability was also described in another study conducted in southeastern Brazil[29]. This finding may have been associated with a notable number of older adults with dementia presenting high scores for depressive symptoms, in association with low literacy in this region. This may also explain the high prevalence of CIND between 60-69 years in this sample (55.8% of all individuals with CIND). These two factors combined ultimately lead to important loss of functionality and independence. This significant difference can also be explained by the diversity of methodologies among different studies, such as use of a population-based approach or differences in the criteria used to define MCI and CIND[28,30]. A previous study using an epidemiological approach[27] indicated that the prevalence of MCI was between 7.7 and 25.2% in several populations around the world. Despite limited data from the Brazilian setting, the incidence of MCI appears to be similar to what has been found in other countries[2]. Nonetheless, broader, population-based studies are necessary in order to increase the numbers of estimates of MCI in developing countries, using previously established clinical criteria for its diagnosis.

An alarming number of individuals scored positive for any degree of depression in this study (48.4% of the total sample). A previous study[31] demonstrated a lower rate of depressive symptoms (14.9%) than that of our sample. Importantly, approximately a third of our total sample had symptoms of

depression at the time of the evaluation without any medical diagnosis of major depression in their medical records. Furthermore, even individuals with the diagnostic criteria for major depression showed important symptoms of depression, thus indicating that their treatment should be re-evaluated. Although a single instrument is not enough to diagnose this disease, the high prevalence of symptoms of depression found in this study indicates that major depression may be under-diagnosed in older adults. Other studies have also found that older adults present high prevalence of depression in primary care evaluations[32,33]. Moreover, a meta-analysis showed that there was a close relationship between depression and cognitive decline, in which the presence of depression not only was a confounding factor for neurodegeneration[34], but also was a risk factor for the development of some type of dementia[35]. There is evidence supporting the benefits of screening for depression among older adults[36,37], especially done by physicians in the primary care setting.

Importantly, a significant number of subjects in this study had a very low level of education. The mean number of years of education for the whole sample was similar to the rates for the state (4.16 ± 3.17 and 4.1 ± 0.06, respectively)[19], and about a quarter of the participants had not completed one year of schooling. Also, the dementia group showed significantly fewer years of education than the cognitively normal controls (Table 1; $p < 0.001$). It is already known that developing countries have lower educational levels than do developed countries[2]. Moreover, the association between lower education and increased risk of dementia is a recurrent subject of interest. Recent studies have suggested that there is a negative association between the number of years of formal education and the risk of dementia, which appears to be stronger before old age[38,39]. Thus, targeting formal education should be a priority for public health policies, in order to reduce the incidence of dementia and its impact on society.

Even though the present study was conducted with our best efforts, it was subject to bias. One major limitation was the way in which the study groups were defined, given that only one cognitive screening (MMSE) was performed, in association with one tool for measuring the severity of disease (CDR), without a scale to evaluate activities of daily living. Because the individuals studied were selected in a specific city region, external validation of this study should be done with caution. In addition, individuals with greater cognitive and functional impairment may have been restricted from primary medical care, which thus would make the dementia group underrepresented. Another important characteristic of our population was the lower-income conditions of the subjects included: patients with better economic conditions are usually attended through private healthcare systems and, hence, they are not properly represented in our sample.

As previously discussed, cognitive decline was only identified through cognitive screenings in our study, which ultimately leads to a higher proportion of differential diagnoses such as major depressive disorder and rapidly progressing dementia. Considering that the prevalence of neurodegenerative disorders is higher than that of other causes of dementia, this may have a slight impact on the interpretation of our results. It is essential that other communities in developing countries should estimate their prevalences and incidences of dementia, so that comparisons can be made and so that the results from our study can be confirmed.

In summary, we described the prevalences of cognitive decline with no dementia (34.8%) and dementia (12.7%) among older adults in a community-based study in Brazil. Importantly, a large number of older adults with symptoms of depression, but no medical diagnosis or treatment, were identified. Practical screening for depression may help to increase recognition and proper treatment of depression among elderly people.

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