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Short Communication

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Physical inactivity and dementia in Brazil: a call to action

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ABSTRACT. Low- and middle-income countries will house two-thirds of cases of dementia in the world by 2050, while the incidence is decreasing in some high-income countries. In Brazil, one in four cases of dementia can be attributable to physical inactivity. Considering the projected prevalence of dementia by 2050 in Brazil, well-coordinated task forces are needed to improve awareness of non-pharmacological approaches in order to reduce the current and projected burden of dementia in the country. In this study, we discussed the current scenario and perspectives of physical inactivity and dementia in Brazil.

Keywords: Dementia; Exercise; Brazil.

INATIVIDADE FÍSICA E DEMÊNCIA NO BRASIL: UMA CHAMADA PARA A AÇÃO

RESUMO. Os países de baixa e média renda abrigarão dois terços dos casos de demência no mundo até 2050, enquanto em alguns países de alta renda a incidência está diminuindo. No Brasil, um em cada quatro casos de demência pode ser atribuído à inatividade física. Considerando-se a prevalência projetada de demência até 2050 no Brasil, estratégias bem coordenadas são necessárias para melhorar a conscientização sobre abordagens não farmacológicas, a fim de reduzir a carga atual e projetada de demência no País. Aqui, discutimos o cenário atual e as perspectivas sobre a inatividade física e a demência no Brasil.

Palavras-chave: Demência; Exercício Físico; Brasil.

It is estimated that 55 million people are living with dementia in the world, with 10 million new cases every year, or a new case every 3 s[1]. The elevated burden of the disease for patients, family, caregivers, and society made the World Health Organization (WHO) declare dementia as a global public health priority in 2012[2]. In the United States, the number of deaths due to dementia between 2000 and 2019 increased (145%), while the number of deaths decreased for heart disease (-7.3%) and stroke (-10.5%)[3]. In the United States, one in three elderlies still died with dementia, a value higher than the observed with breast and prostate cancer combined. This chaotic scenario is even crueler in low- and middle-income countries (LMIC), where roughly two in three cases of dementia in the world are housed. In Brazil, the hospitalization rate due to dementia increased by 75% from 2010 to 2019[4]. No other chronic disease had a superior change in the same period[4]. As can be seen in Figure 1, the proportion of people aged 60 years or older will rise by 99% from 2020 to 2050 while the cases of dementia per 100,000 individuals will increase by 210%. The number of people living with dementia in Brazil is expected to reach 5.7 million in 2050[5]. This value is 206% higher than the observed in 2019 (1.9 million)[5]. In other words, from the expected 3.8 million new cases of dementia in Brazil from 2020 to 2050, 53% is not explained by population aging.

In high-income countries such as the United States and the United Kingdom,

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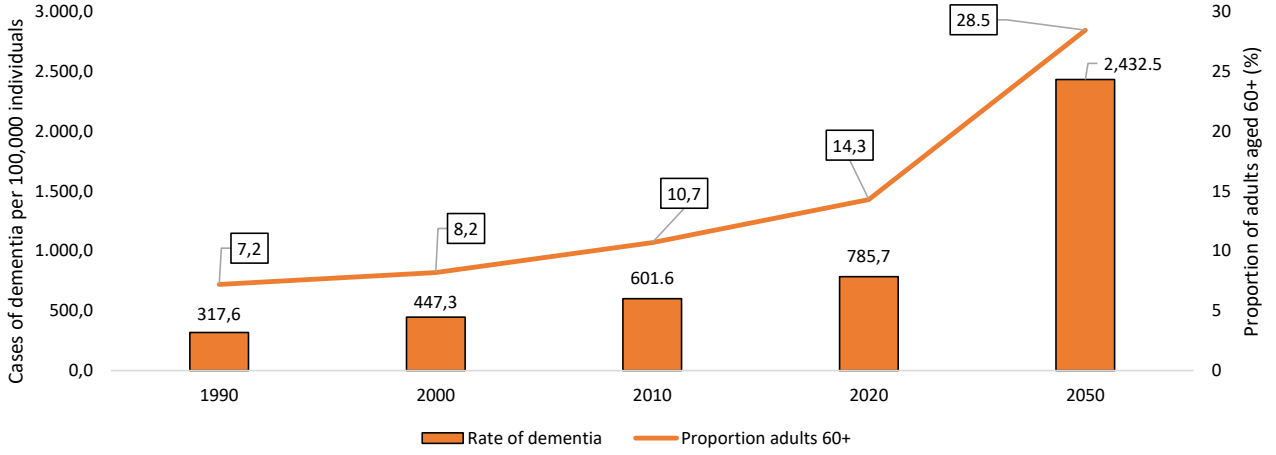

Figure 1. Rate of dementia per 100,000 individuals and proportion of older adults aged 60 years or older in Brazil from 1990 to 2050.

the incidence of dementia and mild cognitive impairment stabilized or even declined over the past years[6-9]. Some factors were suggested to explain this change in the incidence curve, including improved cardiovascular and metabolic health and education access. For example, a study with data from England and Wales reported a declined incidence of dementia from 2002 to 2013[8]. The authors stressed that the increase in physical activity accounted for the largest proportion of the reduction in the incidence of dementia over the period. On the other hand, change in the prevalence of other modifiable such as diabetes, smoking, and depression over time had negative to no confounding effects.

From Barnes and Yaffe's paper published in *The Lancet* in 2011[10] to the latest report from The Lancet Commission on dementia prevention, intervention, and care[11], myriad literature has emerged showing the protective effects on physical activity and the harmful impact of physical inactivity on dementia burden and prevalence. A meta-analysis with 42 cohort studies and 89,205 individuals revealed that high level of physical activity reduced the risk of cognitive decline (hazard ratio [HR]: 0.65; 95% confidence interval [CI] 0.55–0.76) and dementia (HR: 0.86; 95%CI 0.76–0.97) compared to low levels[12]. Noteworthily, the protective association remained after accounting for studies' quality, the number of covariates, and longer follow-up (≥10 years). Particularly in LMIC, the proportion of dementia cases that could be attributable to physical inactivity reached 23.3% in China, 17.0% in Latin America, and 8.4% in India, higher than the global estimative (6.5%)[13]. In Brazil, one in four cases of dementia can be attributable to physical inactivity[14]. On the other hand, four in five adolescents and half of adults in Brazil do not meet the guideline for physical activity. Among older adults, the prevalence of physical inactivity reached 72% and 82% in males and females, respectively[15]. Physical activity is likely to reduce throughout the life course, leading to an increased risk for other cardiovascular risk factors including hypertension and diabetes and, ultimately, increasing the risk of Alzheimer's disease and other dementias. Therefore, promoting physical activity from school-going children and adolescents to older adults must be prioritized in any public health plan to control the burden and incidence of dementia.

However, studies in LMIC investigating the effect of physical activity as an effective alternative to reduce the burden of dementia are scanty. For example, a PubMed, no time- or language-limited search performed in January 2022 using the combination of the terms related to dementia (cognitive impairment, dementia, Alzheimer's disease, vascular dementia), physical activity or exercise, and Brazil, returned only 12 original, non-systematic review articles investigating the effect of either physical activity or exercise in older adults with cognitive impairment or dementia. Regarding cohort studies, there are at least six population-based cohort studies investigating the factors associated with aging in Brazil: the EpiFloripa Idosos, SIGa-Bagé, Estudo Saúde, Bem-Estar e Envelhecimento (SABE), Estudo Longitudinal da Saúde dos Idosos Brasileiros (ELSI-Brasil), Bambuí study, and the COMO VAI? study. Most studies corroborate each other regarding the high proportion of physical inactivity among older adults. The SABE and COMO VAI? studies showed a prevalence of physical inactivity of 85.4%[16] and 82%[17], respectively, values higher than the observed in EpiFloripa Idosos (56.3%)[18], SIGa-Bagé (41.4%)[19], Bambuí (47.7%)[20], and the ELSI-Brasil (33%)[21]. In addition to the territorial, social, and cultural differences among the cities, the instruments to

measure physical activity were also diverse. For example, in the COMO VAI?,[17] SIGa-Bagé[22], EpiFloripa Idoso[18], and in ELSI-Brasil[21], the International Physical Activity Questionnaire (IPAQ) was used. The energy expenditure of physical activity performed in the past 90 days was assessed in the Bambuí study[20]. In SABE[16] and COMO VAI? studies[23], physical activity was also objectively measured using accelerometers. Physical inactivity has multiple consequences for the health of the elderly, and its high prevalence represents an alert for public health. Integrating care policies for the elderly with the practice of physical activity is not only a way to reduce the risk of death and chronic diseases but also an opportunity to improve the quality of life of this important and growing proportion of the Brazilian population.

Despite the relevance of the findings described, some outcomes lack investigation in Brazil, such as cognitive function and the incidence of dementia. For example, the Bambuí (Mini-Mental State Examination [MMSE]), ELSI-Brasil (memory and executive function tests), EpiFloripa (MMSE), and SABE (MMSE) cohorts included measures of cognitive function as an outcome. However, only the ELSI-Brasil included different instruments for memory (10-word Memory Test) and executive function (Verbal Fluency Test), capable of identifying the behavior of different domains of cognitive function over time. Furthermore, only ELSI-Brasil[24] and EpiFloripa[25] examined the prevalence of dementia and associated factors in their populations of interest. Considering the high social and economic burden of cognitive impairment and dementia, incorporating these outcomes in the next stages of the cohorts mentioned here could provide relevant information about its impacts on the health of the elderly population and identify factors that may contribute to attenuating such effects.

This finding is particularly curious, given that Brazil had one of the largest age-standardized prevalence of dementia in the world in 2019[5]. Recently, the Brazilian Federal Senate approved the law project of the National Policy of Integral Care of People with Alzheimer's disease and other Dementias[26]. In the approved document, controlling of dementia burden must include a care system to help patients to live as active as possible. The document also mentioned the need for robust economic investment in the development of pharmacological and non-pharmacological therapeutics for dementia. Nevertheless, the Federal budget for science and technology in Brazil was reduced by 94% in 2021[27]. Most research projects funded by the National Council for Scientific and Technological Development (CNPq, in Portuguese) were suspended due to a lack of funding. In other words, at the moment in which the world population is putting all its hope on vaccine treatment development for the COVID-19, Brazilian science was left aside.

Experiences from other countries have shown that the promotion of healthy habits such as physical activity, increased scientific investment for dementia-related researches, and increased awareness of dementia is an effective triplet to reduce the burden of dementia. We hope that policies including the National Policy of Integral Care of People with Alzheimer's disease and other Dementias will be encouraged and supported by all government levels. Up to 2 million cases of dementia in Brazil can be potentially prevented through a healthy lifestyle, controlling cardiovascular risk factors, and access to education. The future will prove to us whether these lives, their families, and the society were considered priorities of the present and future Brazilian governments.

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