

PREVALENCE OF RISK FACTORS FOR DEMENTIA AND THE ASSOCIATION WITH COGNITIVE CHANGES IN AN ELDERLY POPULATION AT A BASIC HEALTH UNIT IN LONDRINA

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Abstract: The number of older people is increasing globally, including those living with dementia. Dementia is currently the seventh leading cause of death worldwide and a leading cause of disability and dependence among older people. The Lancet Commission's 2020 update on dementia prevention and care highlights evidence for 12 modifiable risk factors, suggesting that up to 40% of dementia cases could be prevented or delayed by eliminating exposure to such factors. Given the increase in the elderly population and cases of dementia, it is understood that preventive actions focusing on modifiable risk factors and early detection of dementia cases are necessary. The methodology was based on a cross-sectional, quantitative and descriptive study. Cognitive screening was carried out in patients aged 60 and over in an area of the territory of a Basic Health Unit in Londrina, using the Mini Mental State Examination (MMSE) and research into 12 (twelve) risk factors for dementia from of a previously prepared questionnaire, with questions about: education, hypertension, hearing impairment, smoking, obesity, depression, physical inactivity, diabetes, social isolation, excessive alcohol consumption, head trauma and exposure to pollution. The interviews were carried out from August to October 2022. 133 individuals were selected and 73 interviews were carried out. The exclusion criteria were: bedridden elderly people, with compromised mobility and inability to communicate understandably. Statistical analysis was carried out using the SPSS program, using Pearson's chi-square tests at a significance level of 5%. It is understood from the results that the present study identified a significant association between altered MMSE and education, with a p-value of 0.016. Of the illiterate patients, 47.6% showed changes in the MMSE. Among individuals with 1 to 4 years of education, 82.8% had altered MMSE. It is concluded that cognitive changes

can be associated with education, as evidenced in other studies. However, the need for more studies on cognitive assessment instruments must be considered, as low education can influence its results, in order to avoid diagnostic errors. Furthermore, it is necessary to continue scientific research in Primary Health Care, focusing on risk factors for dementia, as prevention measures can reduce its risk.

Keywords: Insanity, elderly, low education level.

INTRODUCTION

The number of older people is increasing globally, including those living with dementia, as mortality at a younger age is decreasing, as is the fertility rate. There is an estimated global increase of 117% in the number of people affected by dementia. By 2050, 153 million people are expected to live with dementia worldwide, up from 57 million in 2019, largely due to population growth and population aging (NICHOLS *et al.*, 2022).

Dementia is currently the seventh leading cause of death worldwide and one of the leading causes of disability and dependency among the world's elderly — with global costs in 2019 estimated at more than \$1 trillion. Although dementia mainly affects older people, it is not an inevitable consequence of aging (LIVINGSTON *et al.*, 2020).

The Lancet Commission's 2020 update on dementia prevention, intervention and care highlights evidence for 12 modifiable risk factors for dementia, suggesting that up to 40% of dementia cases could be prevented or delayed by eliminating exposure to such factors: Low education, hypertension, hearing impairment, smoking, obesity, depression, physical inactivity, diabetes, social isolation, excessive alcohol consumption, head trauma and air pollution.

Improvements in access to global education are projected to reduce the prevalence of dementia by 6.2 million cases worldwide by 2050, but this will be countered by predicted trends in obesity, high blood sugar and smoking, which are expected to result in over 6.8 million cases of dementia (NICHOLS *et al.*, 2022).

Regarding the concept, dementia can be defined as a syndrome characterized by the progressive and global decline of memory, associated with the deficit of one or more cognitive functions (language, gnosis, apraxia, executive functions), with intensity that can interfere with daily social performance. or occupational status of the individual (MACHADO *et al.*, 2006; CARAMELLI, BARBOSA, 2002, *apud* ARAUJO, NICOLI, 2010).

The term dementia comes from the Latin: *de* (meaning lack), (*mens* meaning mind). It has been used throughout history to characterize individuals who showed deterioration in their cognitive and behavioral mental functions. The first described case of Alzheimer's Disease (AD), the most common cause of dementia, was reported by Alois Alzheimer, in 1906 (LAGINESTRA-SILVA *et al.*, 2021).

AD is the most common form of dementia in the elderly and its prevalence increases significantly with age. Aging is the most important risk factor for the development of AD, although other factors such as family history and genetics also influence it (PARMERA, 2015).

The development of dementia symptoms generally brings important limitations to the patient's daily life. Cognitive difficulties are not the only causes of suffering for such patients and their caregivers. Emotional and behavioral disorders may be observed concomitantly, including symptoms such as mood changes (depressive symptoms, euphoria, emotional lability), delusions, hallucinations, apathy, irritability, disinhibition, anxiety, verbal and

physical aggressiveness, sleep, appetite and of sexual behavior (PARMERA, 2015).

According to the Brazilian Society of Family and Community Medicine and the Brazilian Academy of Neurology (2009), there are several types of dementia: primary, which result from cortical atrophy, the most common example being Alzheimer's disease; vascular, which result from subcortical atrophy; and secondary ones, which would be those resulting from other diseases, such as hypothyroidism, AIDS, excessive alcohol consumption, vitamin B12 deficiency, syphilis, among others.

For the most part, dementias have an insidious onset and slow progression. However, the most diverse forms of presentation are possible and an accurate diagnostic suspicion in relation to the different forms of presentation of dementia syndromes is essential, especially in the context of Primary Health Care (PHC), to avoid errors or delays in the diagnosis of diseases. potentially treatable.

Evidence from systematic reviews has demonstrated that the Mini Mental State Examination (MMSE) is suitable for screening for dementia among individuals with suspected cognitive impairment, being an important tool for PHC professionals. The MMSE has been widely applied and is therefore the best studied. Its accuracy depends on the age and educational level of the patient (BRAZILIAN SOCIETY OF FAMILY AND COMMUNITY MEDICINE AND BRAZILIAN ACADEMY OF NEUROLOGY, 2009).

Despite its global scope, dementia presents distinct dangers for countries in Latin America and the Caribbean. These regions have a high and increasing prevalence of dementia (between 7.1% and 11.5% among individuals over 65 years of age), compared to the decreasing prevalence in European countries and the United States. Furthermore, it presents relevant risk factors, including a

notable heterogeneity in genetics and social determinants, with political instability and socioeconomic disparities (PARRA *et al.*, 2020), which gives urgency to specific studies and action plans for such countries.

Given the increase in the elderly population and the increase in cases of dementia, it is understood that Primary Health Care (PHC) is a comprehensive care device for the health of the elderly. Therefore, efforts must be made aimed at preventive actions focusing on modifiable risk factors and early detection of dementia cases.

JUSTIFICATION

Considering the growth of the elderly population evidenced to date and the projection of maintaining this growth for the coming years, it is necessary to know the main diseases that affect this population, as well as their risk factors. The consequence of the population aging process is the increase in the prevalence of certain conditions, particularly dementia. Deepening knowledge about dementia and its modifiable risk factors is justified due to the great negative impact on the lives of elderly people. The PHC professional must be prepared to identify these modifiable risk factors in the population in order to create prevention strategies and provide healthy, dignified aging with quality of life.

GOALS

The present study aimed to carry out cognitive screening, identify the presence of modifiable risk factors for dementia in a population of elderly people aged 60 and over in an area of the territory of a Basic Health Unit in Londrina, and understand the relationship between such factors of risk in elderly people with an altered cognitive screening and dementia.

METHODOLOGY

Cross-sectional, quantitative, descriptive study. Cognitive screening was performed on patients aged 60 and over. The studied population belongs to an area of the territory covered by a basic health unit in Londrina, located in the north of the city, which has 4 areas: A, B, C and D, with the elderly in area C being the object of this study. The neighborhood was created 10 years ago, being a national project of “Minha Casa, Minha Vida”. It is located in a region of great socioeconomic vulnerability. The population is mostly young and mostly made up of women. The elderly population, therefore, is a small portion of the total number of registered users in the territory, but the one that demands greater care and the need for home visits.

Cognitive screening was carried out through the application of the Mini Mental State Examination (MMSE), which evaluates and assigns scores to cognitive functions such as temporal orientation (5 points); spatial orientation (5 points); immediate memory (3 points); attention and calculation (5 points); evocation memory (3 points); language (8 points); and visual constructive capacity (1 point), totaling 30 points. The study by Brucki et al. was chosen as a reference for cutoff points. (2003), which are awarded according to education: 20 points for illiterates, 25 points for 1-4 years of study, 26 points for 5-6 years, 27 points for 7-8 years, 28 points for 9-11 years and 29 points for education over 11 years.

A survey of 12 (twelve) risk factors for dementia was also carried out using the 2020 report of the Lancet Commission “*Dementia prevention, intervention, and care: 2020 report of the Lancet Commission*” as a theoretical reference. Risk factors were investigated using a questionnaire previously prepared by the researchers, with questions about: education (illiterate, 1-4 years, 5-8 years, 9-11 years, more than 11 years of study), hypertension

(previous diagnosis of hypertension and/or use of antihypertensives), hearing impairment (self-reported hearing problem and/or use of hearing aids), smoking (current smoking and/or smoking cessation less than four years ago), obesity (indices of body mass - BMI - above 27), depression (history of diagnosis of depression and/or use of antidepressants), physical inactivity (practice less than 150 minutes of physical activity per week), diabetes (previous diagnosis of diabetes and/or use of hypoglycemic drugs), social isolation (marital status: single or widowed, lives alone and has no contact with friends or family, participation in community activities, paid work), excessive alcohol consumption (consumption of more than 14 units of alcohol per week), head trauma (history of traumatic brain injury (TBI) requiring hospitalization and/or loss of consciousness), exposure to pollution during life (if you lived in an area with a high level of pollution and/or worked in an activity in which there is emission of particulate matter, such as drivers).

The MMSE and questionnaire were applied through home visits and medical consultations carried out at the basic health unit from August 2022 to October 2022, through prior clarifications about the research and the voluntary nature of participation and signature of Free and Informed Consent Form.

A total of 133 individuals were selected for the interview, based on the records of people aged 60 or over from community health agents (CHA) in the area. Among those selected, 73 interviews were carried out, considering refusals, absences from homes and the exclusion criteria: bedridden elderly people, with compromised mobility and inability to communicate understandably. Based on the information collected, statistical analysis was performed to evaluate the correlation between altered MMSE and each risk factor studied, as

well as the correlation between altered MMSE and the association of risk factors. Statistical analysis was carried out using the SPSS program, using Pearson's chi-square tests at a significance level of 5%.

The project of this study was approved by the Ethics Committee for Research Involving Human Beings of the ``*Irmandade da Santa Casa de Londrina*`` - PR, with the Certificate of Presentation for Ethical Appreciation (CAAE) No. 26756719.2.0000.0099, dated August 25, 2020. Do part of the Research Project Insertion of the Family and Community Medicine Residency into the Health Care Network of the Municipality of Londrina.

RESULTS

The studied population totaled 73 participants over 60 years of age, made up of 50 women (68.4%) and 23 men (31.5%). 47 participants (64.3%) had altered MMSE. Regarding age group, 44 individuals (60.2%) were between 60-70 years old, being the most prevalent age group; 24 individuals between 71-80 years old and 5 individuals between 81-90 years old. Of the total number of research participants, 2 individuals had a previous diagnosis of dementia. Regarding education, the majority of individuals had 4 years or less of study. 72.6% of participants were hypertensive and 31.5% were diabetic. Regarding the hearing deficit variable, 35.6% of patients reported hearing loss. 79.5% of participants met the criteria for a sedentary lifestyle, 28.7% were smokers and 5.4% were alcohol drinkers. 39.7% of participants reported a history of depression and 26% were socially isolated. 52% individuals were classified as obese. Regarding the pollution variable, 38.3% of patients reported a history of exposure to pollution and 13.6% had a history of TBI.

The association of 3 or more risk factors was present in 64 of the 73 participants, corresponding to 87.6%. The association of risk factors with cognitive changes was not significant in this study, however this data is of great importance in terms of public health, as these risk factors have a direct impact on the health of the elderly population and place a burden on the health system.

Of the variables analyzed, a significant association (p-value 0.016) was identified between altered MMSE and education. 82.8% of elderly people with 1-4 years of education had altered MMSE.

The present study did not find statistical significance between the other variables studied and changes in the MMSE.

Variables, n (%)	Changed MMSE	Normal MMSE	P-Value
Gender			0,671
Female	33 (66)	17 (34)	
Male	14 (60,9)	9 (39,1)	
Education			0,016
Illiterate	10 (47,6)	11 (52,4)	
1-4 years	24 (82,8)	5 (17,2)	
5-8 years	10 (50)	10 (50)	
> 11 years	3 (100)	0 (0)	
Hypertension	34 (64,2)	19 (35,8)	0,946
Hearing deficit	18 (69,2)	8 (30,8)	0,52
Smoking	13 (61,9)	8 (38,1)	0,779
Obesity	24 (63,2)	14 (36,8)	0,82
Depression	16 (55,2)	13 (44,8)	0,182
Sedentary lifestyle	36 (62,1)	22 (37,9)	0,417
Diabetes	17 (73,9)	6 (26,0)	0,249
Social isolation	13 (68,4)	6 (31,6)	0,669
Alcoholism	2 (50)	2 (50)	0,537
TBI	8 (80)	2 (20)	0,267
Pollution	19 (67,9)	9 (32,1)	0,625

Table 1: Survey data.

Source: elaborated by the author.

DISCUSSION

EDUCATION

This study found a significant association between education and altered cognitive screening, which can also be found in other studies that associated education with cognitive impairment.

Studies indicate that high levels of education and cognitive stimulation imply a reduction in the risk of dementia, a fact that can be explained by the possibility of greater cognitive reserve in individuals with greater education, with emphasis on the stimulation that occurs in the first 20 years, due to greater neuroplasticity at this stage of life. Studies also reveal that activities such as music, social outings, travel, learning a new language, were associated with the maintenance of cognition. A Chinese study demonstrated a reduced risk of dementia among elderly people aged 65 and over who perform activities such as reading, gaming and betting (LIVINGSTON *et al.*,2020).

The low education level of elderly people is a consolidated theme in the literature, being relevant mainly in developing countries, where the number of elderly people with low levels of education is higher (LUCHESE *et al.*,2021).

A study that evaluated the prevalence and factors associated with symptoms suggestive of dementia in elderly people found results similar to those of the present study with regard to education, making it possible to observe higher rates of symptoms suggestive of dementia among illiterate elderly people (LINI, *et al.*, 2016).

It is important to highlight the possibility of diagnostic errors due to the influence of low education on performance in cognitive tests. The relationship between education and dementia is presented in a complex way in the literature. The number of years of study

has been considered both a neural protection factor and an element of diagnostic confusion, since the performance of individuals tested with cognitive assessment instruments is strongly influenced by education.

A study sought to estimate the influence of low education and illiteracy on the assessment of dementia through the application of the Mattis Dementia Rating Scale (MDRS) and it was observed that illiteracy was a determining factor for low performance on the score; Furthermore, education above 15 years showed superior performance when compared to other groups.

This same study mentions that one of the main difficulties in using neuropsychological assessment instruments is that most of them have normative data, made up of small samples, generally built in developed countries, with at least eight years of education, with standards sociocultural and economic aspects that are very different from Brazilian standards. The study also mentions that, in Brazil, in addition to low education, there is still a large number of illiterates: 12.8% of the population over 10 years old, mainly in the age range of 50 or over, which represents almost half (48.7%) of Brazilian illiterates (FOSS; VALE; SPECIALI, 2005). These data reinforce the need for studies and development of appropriate tests for cognitive assessment of the low-education population in order to avoid diagnostic errors.

It is also important to consider that the educational level of the population has been growing in Brazil. Data show that the average years of study for Brazilians over 25 years old went from 8.9 in 2016 to 9.4 in 2019 and the illiteracy rate among the elderly went from 20.4 to 18.0% in the same period. Therefore, it is worth pointing out the theory of cognitive reserve, which says that experiences such as education, occupation and cognitive capacity, combined with genetic factors, can increase the cognitive process (LUCHESE *et al.*,2021).

HYPERTENSION AND DIABETES

Hypertension is a risk factor for diseases resulting from atherosclerosis and thrombosis, which are predominantly manifested by cardiac, cerebral, vascular, peripheral and/or renal ischemic involvement. The degenerative brain changes typical of aging, associated with circulatory impairment, produce changes in the structures responsible for controlling autonomic reflexes. This reduces the ability to self-regulate cerebral blood flow, especially when sudden and wide fluctuations in blood pressure occur (SASHIDA, FONTES, DRIUSSO, 2008).

In a study from Santa Catarina that evaluated the factors associated with dementia in a group of 287 elderly people aged 60 and over, it was observed that hypertensive elderly people had a 168% greater chance of having dementia. In the study in question, as well as in the present study, no association was found between diabetes and dementia/cognitive impairment.

However, studies point to an association between diabetes and dementia, with the risk being greater depending on the duration and severity of diabetes. It has not yet been established whether there is a protective effect on this risk with the use of hypoglycemic medications (SANTOS, BESSA, XAVIER, 2020).

Evidence suggests that antihypertensive drugs, especially renin-angiotensin system inhibitors and calcium channel blockers, may have an impact on reducing the incidence and progression of cognitive disorders and dementia. However, the relationship between blood pressure and the brain is complex and may have several influencing factors (LUCHESE *et al.*, 2021).

EXCESSIVE ALCOHOL CONSUMPTION AND SMOKING

The relationship between excessive alcohol consumption, brain changes, cognitive impairment and dementia is known in the literature. A UK study with more than 23 years of follow-up concluded that drinking more than 14 units of alcohol per week was related to right hippocampal atrophy on MRI. (LIVINGSTON *et al.*, 2020).

A study that carried out a bibliographical survey on chronic alcoholism and its consequences mentions that chronic alcohol use induces widespread neuroadaptations in the nervous system, which can last throughout life, which involves the remodeling of synapses that are dependent on changes in gene expression in the presence of chronic alcohol use. This study also mentions that the effects of alcohol on the brain are diverse and include changes in the levels and function of neurotransmitters, receptors, enzymes and other molecules, culminating in synaptic changes in the brain circuits that regulate compulsivity and inhibition (SILVEIRA, 2021).

More than half of individuals presenting for alcoholism treatment demonstrate mild to severe deficits in abstract reasoning, executive functions, visuospatial skills, new learning and memory (MARLATT; BLUME, SCHMALING, 2000, *apud* OLIVEIRA, LARANJEIRA, JAEGER, 2002). Neuroimaging studies have confirmed that alcohol-related brain dysfunction is reversible in many people following alcohol abstinence for some time (BROWN; TAPERT; BROWN, 2001 *apud* OLIVEIRA; LARANJEIRA; JAEGER, 2002).

A study carried out in Porto Alegre evaluated whether there is a change in visual perception and immediate memory in male individuals diagnosed with alcoholism, admitted to units specialized in the treatment of chemical dependency, through the application

of the Rey Complex Figure test, in two moments, with an interval of 3 months. In this study, it was observed that there was a significant difference between the results of the first and second application of the test with regard to immediate memory, suggesting an improvement in this cognitive function with abstinence from alcohol. Participants who remained without drinking alcohol during the interval between the two assessments showed an improvement in their perceptual and memory activity. This reinforces the evidence of the effects of alcohol on cognition and its character as a modifiable risk factor, with evidence of possible reversal of the effects with the elimination of the risk factor, except in severe cases, with advanced cognitive impairment (OLIVEIRA, LARANJEIRA, JAEGER, 2002).

Regarding smoking, studies show that smokers are at greater risk of dementia than non-smokers and that smoking cessation reduces this risk. According to González (2013), in a study carried out with mice, the group of mice that inhaled tobacco smoke showed, compared to controls, a greater accumulation of toxic proteins in the brain, in addition to increased inflammation in areas related to memory and learning. These results point to the conclusion that smoking may be related to the risk of Alzheimer's disease – shortening its onset or worsening its symptoms.

HEARING DEFICIENCY

Studies indicate that hearing loss can result in cognitive decline due to reduced cognitive stimulation. Using a hearing aid can reduce this risk. There is evidence that hearing loss can lead to hippocampal electrophysiological changes, such as changes in the firing patterns of certain pyramidal neurons, especially place cells, essential for both spatial navigation and memory (GOBLE; MOLLER; THOMPSON,

2009; KIM *et al.*, 2007, *apud* MENDES FILHO, 2022). Furthermore, there may be suppression of hippocampal neurogenesis, neurodegeneration, oxidative stress and neuroinflammation (MENDES FILHO, 2022).

Elderly people with hearing impairment generally has worse working memory (or operational memory), selective attention and speech processing when compared to elderly people with good hearing (GUERREIRO; VAN GERVEN, 2017, *apud* MENDES FILHO, 2022). Furthermore, there is a direct correlation between the degree of severity of hearing loss and the risk of developing dementia. (DEAL *et al.*, 2017; GURGEL *et al.*, 2014; LIN *et al.*, 2011, *apud* MENDES FILHO, 2022).

DEPRESSION

Depression in the elderly represents a clinical entity that is still underdiagnosed and inadequately treated in the elderly. About 10% of elderly people who seek primary care experience clinically significant depression. The main risk factors for depression in the elderly include: female gender, social isolation, widowhood/divorce, low socioeconomic conditions, comorbidities, uncontrolled pain, insomnia, functional insufficiency, cognitive dysfunction, polypharmacy and sleep disorders. The following are also considered precipitating risk factors for depression in the elderly: recent bereavement, change of housing/institutionalization, adverse life events (family separation, illness of family member/spouse), previous episodes of depression, alcohol abuse (CARNEIRO; CABRAL, 2016).

Depression is a social problem of epidemiological importance, present in all age groups. In the older population, depressive symptoms may be related to the initial onset of dementia. Depression has been mentioned as a risk factor for dementia, but it must be

considered that it can present itself as a prodrome of dementia. Individuals with a history of depression have approximately twice the risk of developing dementia than those without this history. Depression is related to neuroinflammatory effects that can trigger pathological mechanisms of dementia (LUCHESE *et al.*, 2021).

There is evidence that depression can lead to loss of hippocampal volume, particularly when symptoms are persistent, thus contributing to the onset of dementia (SANTOS, BESSA, XAVIER, 2020).

SEDENTARY LIFESTYLE

Meta-analyses show that physical activity is associated with a reduced risk of dementia. A study with 28,916 participants between 30 and 60 years old found that moderate exercise practiced in middle age, weekly, was associated with a reduced risk of dementia over a 25-year follow-up period. (LIVINGSTON *et al.*, 2020).

It is understood that regular physical exercise can stimulate neurogenesis and synaptogenesis through neurotrophic factors that have their production increased with physical activity. It has been shown, in mice, that physical activity is capable of affecting steroid hormone and stress levels, responsible for influencing learning, neurogenesis and neural plasticity factors such as formation, stability, synaptic specificity and reversibility (PETROIANU *et al.*, 2010).

A meta-analysis carried out with observational studies discusses the practice of physical activity as a factor that can lead to a decrease in the production of beta-amyloid, as well as an increase in its removal and improvement in cerebral circulation. Furthermore, physical activity is related to the improvement of cardiovascular risk factors, improved mood and sleep. In this same review, it was observed that physical activity was significantly associated with a decrease in

the incidence of dementia from all causes and Alzheimer's disease, being a protective factor in all studies analyzed. The study mentions the need for intervention strategies aimed at increasing the practice of physical activity in middle age, in order to reduce the incidence of dementia (ISSO-MARKKU *et al.* 2022).

OBESITY

Systematic reviews show that being overweight in middle age increases the risk of dementia in old age (LIVINGSTON *et al.*, 2020). Obesity is a precursor condition to several disorders, including cardiovascular disease, metabolic syndrome and diabetes. More recently, obesity and its associated comorbidities have been identified as significant risk factors for cognitive decline and the development of Alzheimer's disease (FIGUEIREDO *et al.*, 2021).

A study carried out in Florianópolis investigated the association between dementia and anthropometric indicators in elderly people aged 60 and over. The result was that dementia was associated with obesity and abdominal fat. This same study also mentions that there is no full explanation as to why obesity is associated with dementia; probably due to the possibility of a multifactorial origin, which involves environmental, behavioral, genetic, metabolic and hereditary factors. It is known that visceral fat is metabolically active and secretes pro-inflammatory cytokines that can affect tissues, leading to systemic inflammation. Furthermore, obesity is commonly associated with other chronic diseases, such as diabetes, hypertension and dyslipidemia, which also culminate in systemic inflammation and are known as risk factors for dementia (CONFORTINI *et al.*, 2019).

TRAUMATIC BRAIN INJURY

Studies show an association between traumatic brain injury and increased risk of dementia, especially severe TBI.

Among the most common causes of TBI are car accidents. Cognitive domains such as memory, attention and executive capacity can be affected after TBI, even in injuries classified as mild. Head trauma can lead to tissue damage due to the release of inflammatory substances such as amino acids and free radicals (RAMALHO; CASTILLO, 2015).

TBI can cause overexpression of beta-amyloid precursor protein, leading to the accumulation of beta-amyloid deposits in the brain, similar to that observed in the brains of patients with AD. Other studies also suggest that the pathological link between TBI and Alzheimer's disease may be due to vascular damage, in which the predisposition is due to the fact that TBI causes abnormal cerebral vasculature (MACHADO *et al.*, 2018).

Livingston *et al.* (2020) mentions some studies that point to the association between TBI and the risk of dementia: a nationwide Danish cohort study with almost 3 million people aged 50 or over, victims of traumatic brain injury, followed for approximately 10 years, found increased incidence of dementia and risk of Alzheimer's disease.

The term chronic traumatic encephalopathy refers to sports-related head trauma. A study of former Scottish football players identified that these individuals were more likely to develop Alzheimer's disease.

SOCIAL ISOLATION

The literature defines the term social isolation in several ways, one of which is "an objective state involving minimal contact and interaction with other people, and a generally low level of involvement in community life". It is estimated that around 50% of elderly people around the world are at risk of social

isolation and that approximately a third of people over 60 experience feelings of loneliness (LANDEIRO *et al.*, 2017, apud RODRIGUES, 2021). Some factors are considered a risk for the social isolation of the elderly, such as reduction in family size, loss of social roles, poverty, loss of a spouse, migration of children, physical or mental illnesses that lead to loss of autonomy, domestic violence, insecurity in the community. Studies in Social Sciences conclude that social networks and social participation are protective factors of cognitive performance in older ages and that, on the contrary, social isolation is associated with cognitive decline and a greater likelihood of developing dementia. (RODRIGUES, 2021).

Rodrigues (2021) mentions 3 theories, proposed by Fratiglionie and collaborators, which evaluate the mechanisms that could explain the association between cognitive decline and social isolation, although they are not yet fully clarified: cognitive reserve theory, considers that specific components of the lifestyle, like social, physical and mental factors, increase cognitive reserve, making the individual more resilient to neuropathological damage; vascular theory, suggests that certain lifestyle components (physical exercise, balanced diet, healthy habits, cognitive stimulation, social involvement, among others), can provide beneficial effects in the prevention of cardiovascular diseases and stroke, which are, in turn, instead, risk factors for decline in cognitive function; Stress theory proposes that active lifestyles will inherently provide more opportunities for social engagement, which may lead to less stress, whereas exposure to stress for long periods could increase the risk of dementia.

Among elderly patients, marital status is an important factor for social engagement. A Japanese cohort study, with elderly people over 65 years of age, assessed social contact using a scale, with a 5-point assessment: marital status,

contact with family members, contact with friends, participation in community groups, work paid. Those who scored highest were 46% less likely to develop dementia compared to those who scored lowest. (LIVINGSTON *et al.*, 2020).

ATMOSPHERIC POLLUTION

Animal models suggest that airborne particulate pollutants accelerate neurodegenerative processes through cerebrovascular processes, cardiovascular disease, and beta-amyloid deposition. High concentrations of nitrogen dioxide are associated with an increased incidence of dementia. A systematic review of longitudinal studies monitoring exposure to air pollutants and incidence of dementia identified an association with an increased risk of dementia with exposure to carbon monoxide and nitrogen dioxide (LIVINGSTON *et al.*, 2020).

FINAL CONSIDERATIONS

There is a growing expectation of an increase in the number of elderly people in the coming years, considering aspects such as increased life expectancy, reduced fertility rates and mortality at a young age. Consequently, there are projections of a higher prevalence of chronic diseases, with an important emphasis on dementia. Considering the great impact on the quality of life and health of elderly people caused by dementia, continued scientific advancement in this area is necessary.

REFERENCES

- ARAÚJO, Claudia Lisy; NICOLI, Juliana Silva. Uma revisão bibliográfica das principais demências que acometem a população brasileira. *Revista Kairós Gerontologia*, v13, p. 231-244, 2010.
- CARNEIRO, J. CABRAL, H. A linha tênue entre a demência e depressão no idoso: relato de caso. *Revista Portuguesa de Medicina Geral e Familiar*, v. 32, n. 2, p. 118-24, 2016.
- CONFORTIN, Susana Cararo et al. Indicadores antropométricos associados à demência em idosos de Florianópolis-SC, Brasil: Estudo EpiFloripa Idoso. *Ciência & Saúde Coletiva*, v. 24, p. 2317-2324, 2019.
- DA SILVEIRA, Francis Moreira. Alterações comportamentais no etilismo crônico: uma visão do neurofuncionamento e molecular. *CPAH Science Journal of Health*, v. 4, n. 1, 2021.

The present study found a significant association between education and cognitive changes, which is corroborated by other studies, which mention the relationship between education and dementia, especially low education as a risk factor for dementia. It is worth remembering the possibility of diagnostic errors due to the possibility of low education being a factor in poor performance in neurocognitive assessment tests.

In this research, no significant association was found between altered MMSE and the other variables studied. It can be stated that this study has some limitations that must be considered.

The studied population comprises a small sample of elderly people, with their own characteristics in terms of social and demographic context. Therefore, compared to the general population, it does not become a significant sample, as it is not a population-based sample. Therefore, the research results cannot be generalized. Another limitation refers to the fact that the instruments used to identify the variables were only self-report measures, which may cause data omission on the part of the participants. It is concluded that considering the importance and current nature of the topic discussed in this study, it is necessary to continue scientific research in Primary Health Care, focusing on risk factors for dementia, as prevention measures can reduce its risk.

FIGUEIREDO, B. Q. de *et al.* Processo inflamatório decorrente da obesidade corroborado a anormalidades cerebrais. **Research, Society and development**, v. 10, n. 11, 2021.

FOSS, Maria Paula; VALE, Francisco de Assis Carvalho do; SPECIALI, José Geraldo. Influência da escolaridade na avaliação neuropsicológica de idosos: aplicação e análise dos resultados da Escala de Mattis para Avaliação de Demência (Mattis Dementia Rating Scale-MDRS). **Arquivos de Neuro-Psiquiatria**, v. 63, p. 119-126, 2005.

GONZÁLEZ, I. Tabaco y demência: Fumar incrementa, en ratones transgênicos, el riesgo de padecer la enfermedad de Alzheimer. **Nature communications**, v. 4, n. 1, p. 1495, janeiro, 2013.

ISO-MARKKU, Paula *et al.* Physical activity as a protective factor for dementia and Alzheimer's disease: systematic review, meta-analysis and quality assessment of cohort and case-control studies. **British Journal of Sports Medicine**, v. 56, n. 12, p. 701-709, 2022.

LAGINESTRA-SILVA, A. *et al.* Prevalência de demências no Brasil: um estudo de revisão sistemática. **Revista Neurociências**, v. 29, p. 1-14, 2021.

LINI, E. V. *et al.* Prevalência e fatores associados aos sintomas sugestivos de demência em idosos. **Ciências & Cognição**, v. 21, n. 2, p. 189-97, Dez. 2016.

LIVINGSTON, G. *et al.* Dementia prevention, intervention, and care: 2020 report of the Lancet Commission. **The Lancet Commissions**, v. 396, jul., 2020, p.413-460. Disponível em: www.thelancet.com. Acesso em: 24 mai. 2022.

LUCHESE, B. M. *et al.* Prevalence of risk factors for dementia in middle- and older- aged people registered in Primary Health Care. **Dement Neuropsychol**, v.15, n.2, Apr./Jun. 2021.

MACHADO, B. J. M. *et al.* Alzheimer: fatores de risco associados a doença de Alzheimer. **UniEvangélica**, junho, 2018.

MENDES FILHO, D. **Poluição sonora e perda auditiva podem levar a prejuízo cognitivo e quadros de demência?** 2022. Tese (Doutorado). Universidade de São Paulo, São Paulo, 2022.

NICHOLS, E. *et al.* Estimation of the global prevalence of dementia in 2019 and forecasted prevalence in 2050: an analysis for the Global Burden of Disease Study 2019. **The Lancet**, v. 7, fev., 2022. Disponível em: www.thelancet.com/public-health. Acesso em: 24 mai. 2022.

OLIVEIRA, M., LARANJEIRA, R., JAEGER, A. Estudo dos Prejuízos Cognitivos na Dependência do Alcool. **Psicologia, Saúde e Doenças**, v. 3, n. 2, p. 205-212, 2002.

PARMERA, J. B., NITRINI, R., Demências: da investigação ao diagnóstico. **Rev Med**, São Paulo, v. 94, n. 3, 2015, jul./set, p. 179-84.

PARRA, M. A. *et al.* Dementia in Latin America: Paving the way toward a regional action plan. **The Journal Of The Alzheimer's Association**, v. 17; 2021, p.295-313. Disponível em: wileyonlinelibrary.com/journal/alz. Acesso em: 24 mai. 2022.

PETROIANU, Andy *et al.* Atividade física e mental no risco de demência em idosos. **Jornal Brasileiro de Psiquiatria**, v. 59, p. 302-307, 2010.

RAMALHO, Joana; CASTILLO, Mauricio. Dementia resulting from traumatic brain injury. **Dementia & Neuropsychologia**, v. 9, p. 356-368, 2015.

RODRIGUES, P. M. **Isolamento Social e Função Cognitiva em Idades Avançadas**: um estudo com base no projeto SHARE. 2022. Dissertação (Mestrado em Sociologia em Políticas Sociais), Universidade do Minho, Instituto de Ciências Sociais, 2021.

SANTOS, C. de S. dos; BESSA, T. A. de; XAVIER, A. J. Fatores associados à demência em idosos. **Ciência & Saúde Coletiva**, v. 25, p. 603-611, 2020.

SASHIDA, C T.; FONTES, S. V.; DRIUSSO, P. Relação entre hipertensão arterial e cognição. **Rev Neurocienc**, v. 16, p.152-156, 2008.

SOCIEDADE BRASILEIRA DE MEDICINA DE FAMÍLIA E COMUNIDADE ACADEMIA, BRASILEIRA DE NEUROLOGIA, DEMÊNCIA DO IDOSO: Diagnóstico na Atenção Primária à Saúde. Associação Médica Brasileira e Conselho Federal de Medicina, 2009.