Scientific Research Publishing

Journal of Biosciences and Medicines, 2023, 11, 161-172
https://www.scirp.org/journal/jbm
ISSN Online: 2327-509X
ISSN Print: 2327-5081

Profiles of Major Cognitive Disorders in Elderly People Followed at the Geriatric Clinic of Fann National University Hospital in Senegal

Massamba Bâ, Assane Sall*, Rokhaya Djajheté, Ibrahima Diallo, Dalahata Bâ, Mamadou Coumé

Department of Geriatrics, Fann National University Hospital, Dakar, Senegal
Email: *assanesall513@gmail.com

How to cite this paper: Bâ, M., Sall, A., Djajheté, R., Diallo, I., Bâ, D. and Coumé, M. (2023) Profiles of Major Cognitive Disorders in Elderly People Followed at the Geriatric Clinic of Fann National University Hospital in Senegal. *Journal of Biosciences and Medicines*, **11**, 161-172.
https://doi.org/10.4236/jbm.2023.1112015

Received: October 7, 2023
Accepted: December 10, 2023
Published: December 13, 2023

Abstract

Introduction: The aging of the world's population is accompanied by an increase in the prevalence of chronic pathologies, including major neurognitive disorders (MNCD), which are a true global public health problem. The aim of this study was to update the epidemiological, diagnostic and therapeutic aspects of MNCD in elderly subjects in the first geriatric university department in Senegal and the sub-region. **Materials and Methods:** This was a retrospective and descriptive study from January 1, 2020 to January 1, 2021. It concerned subjects aged 65 years and over received in the department with MNCD diagnosed by using the Senegal test and the IADL score of Lawton. **Results:** Out of a total of 510 patients, major cognitive impairment was diagnosed in 61, representing a prevalence of (11.9%). The mean age was 70 years ±7 (extremes 65 - 98 years), with a male predominance (52%), (sex ratio 1.1). Sixty-four percent (64.10%) of the subjects were married, (25%) illiterated, (93.44%) lived with their families and fifty percent (50.81%) were well cared for. Antecedents and comorbidities included arterial hypertension (59.02%). Neurocognitive manifestations were dominated by memory disorders (62.30%), followed by anxiety and/or hallucinations (52.45%). MNCD were severe in (63.93%). The etiologies of CMND were dominated by Alzheimer's disease (46%), followed by vascular causes (31%). Geriatric syndromes associated with dementia were dominated by loss of autonomy (88.52%) and frailty (65.57%). Memantine was the most prescribed anti-dementia treatment (72.13%). Psychosocial care in the form of home assistance was provided in 88.52% of cases. **Conclusion:** The prevalence of MNCD remains high compared to data from the African region. This indicates the importance of organizing the management of cases with serious consequences for caregivers. The etiologies remain dominated by Alzheimer's disease and vascular MNCD.

Keywords
Dementia, Dakar, Elderly

1. Introduction

The aging of the world's population is one of the greatest challenges of the 21st century. The world's geriatric population is expected to grow from around 962 million (13%) in 2017 to 1.4 billion (19.5%) in 2030, and to double by 2050 [1], with a more accelerated rate in developing countries. In sub-Saharan Africa, the geriatric population is set to rise from 46 million in 2015 to 157 million by 2050 [2]. Senegal is not immune, with life expectancy rising from 59 years in 2008 to 66 years in 2015 [3]. This demographic transition is accompanied by an increase in the prevalence of chronic pathologies, including major neurocognitive disorders (MNCD) defined as the impairment of one or more cognitive functions, including memory, associated with a loss of autonomy [4].

It is a major, long-term public health problem [5]. The World Health Organization (WHO) estimates that 5% to 8% of people aged 60 or over worldwide suffer from MNCD, *i.e.* around 50 million. This figure is set to rise to 74.7 million by 2030 and 131.5 million by 2050 with a higher burden in low- and middle-income countries [6]. In Africa, studies on the prevalence of major cognitive impairment have found rates ranging from 2% to 3% in people aged 70 to 75, to 20% to 25% in people aged 85 or over [7]. It is one of the most common causes of geriatrics syndromes as loss of independence, malnutrition and frailty. They entail major costs in terms of care, with significant human and financial investment [5]. In developed countries, several studies have been carried out and significant progress has been made in terms of early diagnosis with the advent of biomarkers (tau proteins, amyloid b amyloid, etc.) and immunotherapy [8] [9]. In developing countries, MNCD is a real problem, with a delay in diagnosis due to the fact that it is assimilated to ageing, an absence of structures and a lack of specialists (neurologists, geriatricians, psychiatrists, etc.), and inaccessibility to means of diagnosis and treatment [7]. In Senegal, research in this area is still in its infancy, although Touré *et al.* in 2009 laid the foundations by establishing a reliable and internationally valid cognitive test specific to our context known as the "Senegal Test" [10]. A more recent study in 2017 identified a prevalence of 9.1% in a Senegalese geriatric population [11].

The opening of the first university geriatric reference service was an opportunity to update data on neurocognitive disorders in Senegal. The aim of this study was to determine the epidemiological, clinical and etiological characteristics of major cognitive disorders in a population of elderly Senegalese patients seen in the geriatrics department of the FANN university hospital.

2. Materials and Methods

Our study took place in the geriatrics department of FANN University Hospital.

The Fann hospital is a reference structure at the top of the health pyramid. It provides an ideal setting for a multidisciplinary specialty such as geriatrics, enabling perfect collaboration with other medical specialties (neurology, psychiatry, infectious diseases, pneumology, cardiology, emergency, physical medicine, etc.). The geriatrics department was created in 2015, temporarily housed in the building allocated to the emergency department. At the time, its activities were limited to outpatient consultations. Since August 2019, the department has had its own premises adapted to the care of the elderly. It has an 8-bed geriatric short-stay hospitalization capacity (2 single wards and 3 wards with 2 beds each) associated with a 3-bed outpatient and day hospitalization unit. The department also has a Mobile Geriatric Unit (MGU) with 2 sub-units: MGU intra and extra hospital, responsible respectively for elderly patients admitted to other medical-surgical departments, and for home visits to elderly patients with reduced mobility.

This is a retrospective descriptive and cross sectional study covering a period of one year from 1 January 2020 to December 31, 2021. Patients aged at least 65 years and seen in a geriatric consultation with a diagnosis of MNCD disorders based on the disturbed Senegal neurocognitive test with a score < 28/39 and a loss of autonomy for instrumental activities of daily living (IADL) with score < 2/4 were included in the study.

The "Senegal Test" has been developed to screen Senegalese elderly people for MNCD [10]. It comprises 5 subscales relating to different cognitive domains, with a total score of 0 - 39, distributed as follows: orientation (score 0 - 8), memory (score 0 - 24), attention/calculation (score 0 - 2), executive functions/praxis (score 0 - 3), language (score 0 - 2). It is valid and reliable for screening for major cognitive disorders, with a sensitivity of 93.1%, a specificity of 89.6%, a positive predictive value of 93.1% and a negative predictive value of 92.8% at the cut-off point of 28/39 points, an area under the curve of 0.967 and a kappa of 0.82. Its administration is easy and time-saving (around 12 - 15 minutes); it is accepted by the elderly people interviewed. Age and education had no influence on its diagnostic performance

Then an etiological research approach was carried out with a clinical examination, additional basic biological investigations (blood count, urea creatinine level, transaminase, vitamins B 9 and 12, calcemia, syphilitic serology, viral hepatitis and HIV retroviral) and imaging (cerebral CT or magnetic resonance imaging). The etiologies were selected on the basis of international criteria [12]. Alzheimer's disease (AD) was diagnosed when there was hippocampal atrophy and no secondary cause; frontotemporal MNCD when there was frontal and/or temporal cerebral atrophy; Parkinson disease MNCD for MNCD in the context of Parkinson's disease; vascular cause when there was a relationship between cognitive impairment and vascular lesions on imaging.

Patients whose cognitive status could not be assessed by cognitive testing and who were not known to have cognitive disorders, brain imaging or basic biolog-

ical check-up were not included. A data collection form was drawn up. In the consultation registers, the following variables were collected: socio-demographic characteristics, medical history, family history of dementia, lifestyle, clinical and imaging manifestations, treatments instituted.

Data were entered and analyzed using Epi-info version 7 software. Qualitative variables were expressed as numbers and percentages, and quantitative variables as mean with standard deviation, median and extremes.

3. Results

❖ **Prevalence**

During the study period, 510 patients were seen on the ward. Sixty-one (61) presented with MNCD, representing a prevalence rate of 11.9%.

❖ **General sociodemographic characteristics of the population**

The mean age was 70 ± 7 years, with extremes ranging from 65 to 98 years. The most representative age group was 75 - 84 (45.90%), followed by 65 - 74 (39.34%).

There was a slight male predominance (52.46%), with a sex ratio of 1.1. Nearly a quarter of patients were illiterate (24.59%), and the social network was generally considered good for most patients: always in couples (54.10%), living with family (93.44%), more than 4 ties (50.81%).

Poly pathology (>3) was found in 67.21%. The main antecedents and comorbidities were hypertension (59.02%), followed by family MNCD (50.82%) and stroke (21.31%) (Table 1). The majority of patients had at least four comorbidities (67, 21%). Poly-medication was found in 44.26% of patients, and the main drug classes were analgesics (70.49%), antihypertensive drugs (42.62%) and antibiotics (29.51%). A quarter (24.59%) of patients were weaned smokers. (Table 1)

❖ **Clinical manifestations**

Cognitive disorders were at the forefront of the picture (47.8%). The areas most affected were memory (62.3%), language (39%), gnosia (21%) and praxis (19%). Psychological behavioral disorders (36.7%) were in the background, consisting of food refusal (50.82%), anxiety and/or aggression (52.46%) and hallucinations (21.31%). Motor symptoms (15.5%) were dominated by acute motor deficit (36.06%). Cognitive disorders according to the Senegal test were severe (63.93%), moderate (27.87%) and mild in 8.20% of patients. More than a third (1/3) of patients (32.78%) had a duration of evolution of at least 5 years. Geriatric syndromes were dominated by loss of functional autonomy (88.52%), followed by frailty (65.57%) and undernutrition (49.18%) (Table 2).

❖ **Imaging**

Cerebral CT was the most frequently performed imaging test (86.88%), with cerebrovascular lesions predominating (43%), followed by vascular lesions (21.31%) and cortico-subcortical atrophy (16.39%). Cerebral MRI was performed in 26.2% of patients, revealing mainly hippocampal atrophy (62.5%), followed by cortico-subcortical atrophy (31.25%) and normal-pressure hydrocephalus (6.25%).

Table 1. Distribution by general characteristics of population.

Caractéristics		Numbers	Frequency (%)
Meanage: 70 ± 7 years	65 - 74	24	39.34
	75 - 84	28	45.90
	85 - 94	8	13.11
	>94	1	1.64
Sex	Men	32	52.46
	Women	29	47.54
Standard of living	Good	8	13.11
	Medium	46	75.41
	Poor	7	11.48
Social links	Always a couple	33	54.10
	≥4 links	31	50.81
	Living in a family	57	93.44
Geographical origin other regions	Dakar region	46	76.41
	Otherssregions	6	9.84
	Out of country	9	14.75
Literacy	Illeterate	15	24.59
	Educated	22	36.07
	Indeterminated	24	39.34
Past occupation	Formal	52	85.25
	Unspecified	20	32.79
	Non-formal	20	32.79
History	Familial dementia	31	50.82
	Stroke	13	21.31
Comorbidites	Parkinson's disease	5	8.1
	Heart disease	5	8.1
	Diabetes	2	3.28
	High blood pressure	35	59.02
	Epilepsy	1	1.64
Style of life	Coffee	52	85.25
	Active tobacco	15	24.59
	Alcohol	1	1.64

❖ Etiologies

The etiologies found were, in descending order: AD (46%), vascular MNCD (31%), frontotemporal MNCD (9.84%), Parkinson's MNCD (8.20%) and other unlabelled etiologies (4.82%) (**Figure 1**).

Table 2. Distribution by clinical manifestation.

Types of Signs	Signs	Numbers	Frequency (%)
Cognitive disorders (47.8%)	Memory disorders	38	62.30
	Language disorders	34	39.34
	Temporo-spatial disorientation	5	8.1
	Praxis disorders	12	19.67
	Gnosticdisorders	13	21.31
Disorders behavioral (36.7%)	Refusal to eat	31	50.82
	Anxiety/aggression	32	52.46
	Hallucinations	13	21.31
Motordisorders (15.5%)	Motordeficit	22	36.06
	Parkinson syndrome	5	8.1
	Others abnormal movements	5	8.1
Geriatrics syndromes (100%)	Loss of autonomy (IADL)	54	88.52
	Loss of functional autonomy (ADL)	54	88.52
	Frailty	40	67.57
	Denutrition	30	49.18

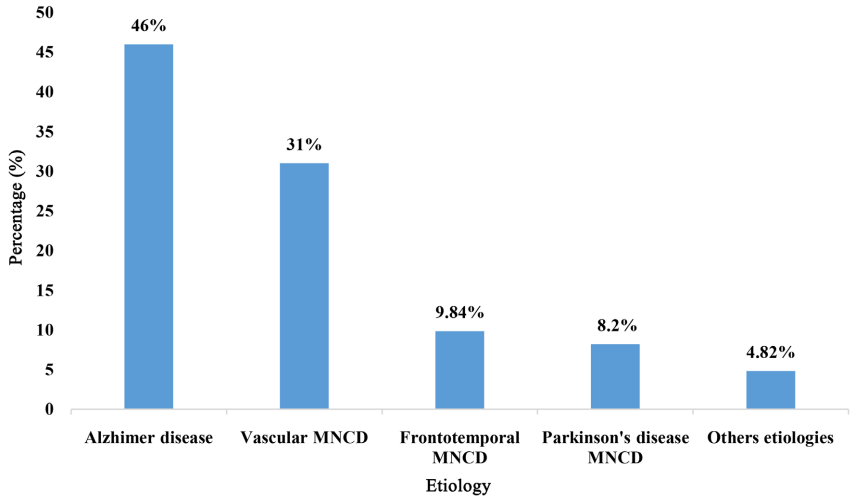

Figure 1. Distribution by etiology.

❖ Treatment

Medication management depended on etiology. In AD, the most common form, the main drugs prescribed were memantine (72.13%) and Donepezil (31.14%). In frontotemporal MNCD, Ecitalopram was routinely prescribed, and in patients with Lewy bodies MNCD, clozapine was prescribed in all patients. Non-medicinal means were psychosocial care (88.52%).

4. Discussion

In our study of 510 patients aged 65 or over seen in the geriatrics department of Fann Hospital, with an average age of 70 ± 7 years (65 - 98 years), the overall prevalence of NCD was estimated at 11.9%.

Our prevalence is higher than previous data from Senegal. At the Senegalese Retirement Welfare Institute (SRWI), Coumé *et al.* found in 2009 and 2017 an overall prevalence of 6.6% and 9.1% respectively [10] [11]. This shows a clear increase in the prevalence rate between these 2 studies of around 2.8% between 2017 and 2021. Elsewhere in Africa, prevalence rates are lower. In Tunisia, it was 4.6% [13]. In Central Africa in 2010, it was estimated at 8.1%, while the Guerchet *et al.* [14] study found a variable prevalence of 6.7% to 8.1%. However, our prevalence is close to that of developed countries. In the United States and Japan, studies on geriatrics populations over 65 years of age found an identical prevalence of 11% [15] [16]. The 11.9% prevalence of MNCD found in our study, compared with national and international figures, suggests a gradual increase in the prevalence of dementia in Africa and Senegal. This can be explained by the rapid ageing of the population and increasing life expectancy. Added to this is the proliferation of geriatric centers and the establishment of the National Alzheimer's Association, headquartered at Fann Hospital. The aim of this association is to raise public awareness of AD and provide psychological and social support for patients and their families. The average age of our sample was 72 ± 7 years, with the 75 - 80 age group being the most representative (28%). Coumé *et al.* found a prevalence rate of 26% in the 80+ age group. Studies on the prevalence of major cognitive impairment have found rates ranging from 2% - 3% in people aged 70 - 75 to 20% - 25% in those aged 85 or over [6]. Indeed, advanced age is the major and clearly established risk factor for major neurocognitive disorders.

A slight male predominance was reported at 52.46%, in line with previous studies by Coumé *et al.* [10] and NND Ndiaye *et al.* [17] in Senegal. In the Paquid study, the incidence of AD before the age of 80 was higher in men than in women, whereas the opposite was true after the age of 80 [18]. Furthermore, a meta-analysis estimates a higher prevalence of AD in women [19]. The disparity between our results and those of the literature could be explained by the fact that, in our countries, men have far more religious, professional and social responsibilities. Their disorders are therefore much more visible, and lead to a greater need for consultation.

The main risk factors identified were: a family history of MNCD (50.82%), stroke (21.31%) and blood hypertension (59.02%). Coumé *et al.* [8] found a family history of MNCD (18.4%), stroke (14.2%) and hypertension (59.2%). AD is a multifactorial pathology, involving a combination of both individual (probably with genetic predisposition) and environmental factors. Advancing age is unquestionably the main risk factor for AD [20], with incidence almost doubling for every 5 years of age after 65. Several studies, mainly cross-sectional, have

demonstrated an increased risk of AD in subjects with a first-degree relative suffering from this pathology [21]. Hypertension and atherosclerosis appear to be associated with an increased risk of AD [22], and treatment of hypertension may significantly reduce the incidence of AD [23].

Most patients (54.10%) were still in couples, in line with Coumé's study at SRWI [8]. The majority of our patients (93.44%) lived with their families, and half of them had a strong bond with their loved ones. A longitudinal, multicenter study of people aged 70 to 89 in Finland, Italy and the Netherlands found a significant association between family isolation of 3 to 10 years and the risk of developing cognitive decline [24]. In Senegal, where polygamy is a social and religious practice, we would expect to find many elderly people living in multiple households [25]. A quarter of our patients were illiterate. This result is double that of the SRWI 12% [10] study. This can be explained by the greater representativeness of our study population, and also by the massive attendance of retired civil servants at SRWI. Most studies based on incidence data observe an association between a low level of education and an increased risk, especially of the AD [26].

The choice of the Senegal test could also be explained by the limitations of the MMSE test. In 1982, Antony *et al.* demonstrated in a hospital study that the MMSE had a specificity of 63.3% in those with less than 9 years' education. Later, Tambaught and Mcinty showed that the validity of the MMSE could be influenced by non-cognitive factors [9]. The validity of the MMSE is largely influenced by the level of instruction in the Western education system, which is ill-suited to our African context with its high rate of Western literacy. These different aspects could explain the choice of the Senegalese test in our study. In this study, severe MNCD was in the majority, with a rate of 63.93%. This may be explained in part by the delay in consultation, as it is often initially assimilated to normal aging, and on the other hand by the often late indication for referral to geriatric care at the stage of onset of geriatric syndromes.

In our series, AD was the most common cause of MNCD (46%), in line with the literature. AD is recognized as the leading cause of major cognitive impairment worldwide, responsible for 60% - 70% of all cases, most of which are located in developed countries, with 4.6 million new cases recorded every year. In Senegal, Coumè *et al.* found an almost identical rate of 45% (8). This predominance was found in French-speaking Africa in Guerchet's studies [14] [27], with a prevalence of possible or probable AD of 77%. In France, a prevalence of 42.5% was found [28]. Vascular MNCD was the second most common cause of dementia, according to Coumè *et al.* [10] and Guerchet studies [14] [27], accounting for almost 1/5 of all dementias. Frontotemporal MNCD ranked third (9.84%) in our series. A larger study estimates that it accounts for around 20% of neurodegenerative MNCD worldwide [29]. Lewy body MNCD was not found in our study. However, Dial *et al.* [17] found a prevalence of 2% in a Dakar memory clinic. Most French studies estimate its overall prevalence at around 20% in subjects over 65 [30]. The absence of cases in our series could be explained by

its difficult diagnosis, and the massive referral of patients to psychiatry or neurology, in relation to the preponderance of neuropsychiatric manifestations. These results confirm previous studies carried out in Senegal and worldwide on the preponderance of AD and vascular MNCD.

Geriatric syndromes were dominated by: loss of autonomy (88.52%) for ADL and IADL, followed by frailty (65.57%) and undernutrition (49.18%). Loss of autonomy is an integral part of dementia according to the definition of MNCD. Fragility is a phenomenon that comes with physiological aging, through the reduced functioning of all organs and systems. However, MNCD favor its speed of onset and severity. Elderly subjects with dementia often tend to forget to take their meals properly, and this impairs their quality of life (undernutrition). The severity of undernutrition depends on the stage of dementia and the quality of the caregivers. A study of the nutritional status of demented elderly subjects found a prevalence of between 15% and 40% of undernourished subjects [31]. Depression was found in 9.8% of patients. A study in Nigeria [32] found 5.4% in a population aged 60 and over. Baiyewu found 17% depression [33]. Depression often goes undetected, and most depressive symptoms can be mistaken for MNCD Prevention of these geriatric syndromes is possible through: early diagnosis, setting up a caregiver, regular walking, setting up a support unit, and early management of MNCD.

The most widely used drug treatment for AD MNCD was Memantine at a rate of 72.13%, in line with the recommendations of French High Authority for Health in 2011 [34]. This is justified by the higher rate of major cognitive impairment associated with AD and the efficacy of Memantine in severe forms of dementia. However, for over 15 years, all therapeutic trials in AD have been negative, with the exception of the EMERGE study testing the cognitive efficacy of Aducanumab [9]. However, it has not yet been granted marketing authorization in our context. Senolytic treatment is also one of the therapeutic perspectives for AD [35]. There are currently many examples of drug treatments targeting the presumed mechanisms involved in aging and evaluated in the context of AD. Psychosocial care was most frequently provided by supportive psychotherapy and home assistance in 4/5 of our patients. The efficacy of non-pharmacological treatment in the management and prevention of dementia remains fundamental, with fewer associated iatrogenic side-effects [36].

However, our study has some limitations:

Selection bias: some patients could not benefit from biomarker assay and others could not benefit from magnetic reasoning imaging. In addition, the collection of certain data is carried out from the accompanying persons, which reduces the reliability of the data, especially since it is a retrospective study.

The size of our sample was small, which can be explained by the fact that some patients with MNCD were sent to other departments of the hospital such as neurology or psychiatry. It is not possible to extrapolate prevalence data to the hospital or to the national level. Other, larger studies using the novel biomarkers would help to broaden the results to the general level more accurately.

5. Conclusion

The prevalence of MNCD found remains high compared with previous data from Senegal and current data from other African regions. Etiologies remain dominated by AD and vascular dementia. Geriatric syndromes are frequent in the advanced stages of the disease. This underlines the importance of organizing multidisciplinary care (geriatricians, neurologists, psychiatrists, etc.) for cases with serious consequences for caregivers.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Organisation mondiale de la Santé (2021) Rapport Mondial Sur Le Vieillissement Et La Santé. https://apps.who.int/iris/bitstream/handle/10665/206556/?sequence=1

[2] Aboderin, I.A.G. and Beard, J.R. (2015) Older People's Health in Sub-Saharan Africa. *The Lancet*, **385**, E9-E11. https://doi.org/10.1016/S0140-6736(14)61602-0

[3] SENEGAL (2013) Recensement Général de la Population et de l'Habitat, de l'Agriculture et de l'Elevage 2013. http://anads.ansd.sn/index.php/catalog/51

[4] Napon, C., Traore, S., Niakara, A., Ouango, G., Ouango, A. and Kabore, J. (2009) Les démences en afrique subsaharienne : Aspects cliniques et étiologiques en milieu hospitalier à ouagadougou (burkina faso). *African Journal of Neurological Sciences*, **28**, 37-43. https://www.ajol.info/index.php/ajns/article/view/55132 https://doi.org/10.4314/ajns.v28i1.55132

[5] Berthe, A., Berthé-Sanou, L., Konaté, B., Hien, H., Tou, F., Drabo, M., *et al.* (2013) Les personnes âgées en Afrique subsaharienne: Une population vulnérable, trop souvent négligée dans les politiques publiques. *Santé Publique*, **25**, 367-371. https://doi.org/10.3917/spub.253.0367

[6] Rizzi, L., Rosset, I. and Roriz-Cruz, M. (2014) Épidémiologie mondiale de la démence: La maladie d'Alzheimer et les types vasculaires. *BioMed Research International*, **2014**, Article ID: 908915. https://www.hindawi.com/journals/bmri/2014/908915/

[7] McCusker, J., Bellavance, F., Cardin, S., Trepanier, S., Verdon, J. and Ardman, O. (1999) Detection of Older People at Increased Risk of Adverse Health Outcomes After an Emergency Visit: The ISAR Screening Tool. *Journal of the American Geriatrics Society*, **47**, 1229-1237. https://doi.org/10.1111/j.1532-5415.1999.tb05204.x

[8] Liss, J.L., Seleri Assunção, S., Cummings, J., Atri, A., Geldmacher, D.S., Candela, S.F., *et al.* (2021) Practicalrecommendations for Timely, Accurate Diagnosis of Symptomatic Alzheimer's Disease (MCI and Dementia) in Primary Care: A Review and Synthesis. *Journal of Internal Medicine*, **290**, 310-334. https://doi.org/10.1111/joim.13244

[9] Delrieu, J. and Vellas, B. (2020) Les nouveaux traitements de la maladie d'Alzheimer. *Bulletin de l'Académie Nationale de Médecine*, **204**, 237-247. https://doi.org/10.1016/j.banm.2020.01.018

[10] Kamadore Touré, (2007) Développement et validation d'un test de dépistage de la démence chez une population de personnes âgées sénégalaises le Test du Sénégal.

https://papyrus.bib.umontreal.ca/xmlui/bitstream/handle/1866/18216/Toure_Kamadore_2007_these.pdf

[11] Coumé, M., Ba, M. and Touré, K. (2021) The Profile of Major Cognitive Disorders in Elderly Patients of the Geriatric Center of the Senegalese National Retirement Institution, Dakar, Senegal (2010-2017). *Revue Germinal*, **46**, 335-343.

[12] Association, A.P., Guelfi, J.D., Crocq, M.A. and Boehrer, A.E. (2023) Dsm-5-Tr Manuel Diagnostique Et Statistique Des Troubles Mentaux, Texte Révisé. Elsevier Health Sciences, Amsterdam.

[13] Masson, E. (2022) Épidémiologie des démences en Tunisie. https://www.em-consulte.com/article/943234/epidemiologie-des-demences-en-tunisie

[14] Guerchet, M., M'belesso, P., Mouanga, A.M., Bandzouzi, B., Tabo, A., Houinato, D.S., *et al.* (2010) Prevalence of Dementia in Elderly Living in Two Cities of Central Africa: The EDAC Survey. *Dementia and Geriatric Cognitive Disorders*, **30**, 261-268. https://doi.org/10.1159/000320247

[15] Hebert, L.E., Weuve, J., Scherr, P.A. and Evans, D.A. (2013) Alzheimer Disease in the United States (2010-2050) Estimated Using the 2010 Census. *Neurology*, **80**, 1778-1783. https://doi.org/10.1212/WNL.0b013e31828726f5

[16] Venketasubramanian, N., Sahadevan, S., Kua, E.H., Chen, C.P.L. and Ng, T.P. (2010) Interethnic Differences in Dementia Epidemiology: Global and Asia-Pacific Perspectives. *Dementia and Geriatric Cognitive Disorders*, **30**, 492-498. https://doi.org/10.1159/000321675

[17] Ndéye Dialé, N.N., Aida, S., Kamadore, T., Habib, T.M. and Momar, G. (2011) Bilan De Fonctionnement D'Une Clinique De La Memoire Senegalaise. *African Journal of Neurological Sciences*, **30**. https://www.ajol.info/index.php/ajns/article/view/77286

[18] Helmer, C., Pasquier, F. and Dartigues, J.F. (2006) Épidémiologie de la maladie d'Alzheimer et des syndromes apparentés. *Medical Sciences*, **22**, 288-296. https://doi.org/10.1051/medsci/2006223288

[19] Bergman, H., Béland, F., Karunananthan, S., Hummel, S., Hogan, D. and Wolfson C. (2004) Développement d'un cadre de travail pour comprendre et étudier la fragilité. Pour l'initiative canadienne sur la fragilité et le vieillissement. *Gérontologie et Société*, **109**, 15-29. https://doi.org/10.3917/gs.109.0015

[20] McKhann, G., Drachman, D., Folstein, M., Katzman, R., Price, D. and Stadlan, E. (1984) Clinical Diagnosis of Alzheimer's Disease: Report of the NINCDS-ADRDA Work Group under the Auspices of Department of Health and Human Services Task Force on Alzheimer's Disease. *Neurology*, **34** , 939-944. https://doi.org/10.1212/WNL.34.7.939

[21] Launer, L.J., Andersen, K., Dewey, M.E., *et al.* (1999) Rates and Risk Factors for Dementia and Alzheimer's Disease: Results from EURODEM Pooled Analyses.. *Neurology*, **52**, 78-84. https://doi.org/10.1212/WNL.52.1.78

[22] Hofman, A., Ott, A., Breteler, M.M.B., *et al.* (1997) Atherosclerosis, Apolipoprotein E, and Prevalence of Dementia and Alzheimer's Disease in the Rotterdam Study. *The Lancet*, **349** , 151-154. https://doi.org/10.1016/S0140-6736(96)09328-2

[23] Forette, F., Seux, M.L., Staessen, J.A., *et al.* (1998) Prevention of Dementia in Randomised Double-Blind Placebo-Controlled Systolic Hypertension in Europe (Syst-Eur) Trial. *The Lancet*, **352**, 1347-1351. https://doi.org/10.1016/S0140-6736(98)03086-4

[24] Van Gelder, B.M., Tijhuis, M., Kalmijn, S., Giampaoli, S., Nissinen, A. and Kromhou, D. (2006) Marital Status and Living Situation During a 5-Year Period Are As-

sociated with a Subsequent 10-Year Cognitive Decline in Older Men: The FINE Study. *The Journals of Gerontology*: *Series B*, **61**, 213-219. https://doi.org/10.1093/geronb/61.4.P213

[25] Dartigues, J.F., Berr, C., Helmer, C. and Letenneu, L. (2002) Épidémiologie de la maladie d'Alzheimer. *Medecine Sciences*, **18**, 737-743. https://doi.org/10.1051/medsci/20021867737

[26] Fratiglioni, L., Launer, L.J., Andersen, K., *et al.* (2000) Incidence of Dementia and Major Subtypes in Europe: A Collaborative Study of Population-Based Cohorts. *Neurology*, **54**, S10-S15.

[27] Guerchet, M., Mbelesso, P., Mouanga, A.M., *et al.* (2013) Association between a Low Ankle-Brachial Index and Dementia in a General Elderly Population in Central Africa (Epidemiology of Dementia in Central Africa Study). *Journal of the American Geriatrics Society*, **61**, 1135-1140. https://doi.org/10.1111/jgs.12310

[28] Dartigues, J.F., Gagnon, M., Michel, P., Letenneur, L., Commenges, D., Barberger-Gateau, P., Auriacombe, S., Rigal, B., Bedry, R. and Alpérovitch, A. (1991) [The Paquid Research Program on the Epidemiology of Dementia. Methods and Initial Results]. *Revue Neurologique*, **147**, 225-230.

[29] Gil, R. and Wager, M. (2021) Traité pratique de neuropsychologie clinique de l'adulte: Evaluation et revalidation. Elsevier Masson, Gainesville.

[30] Meyniel, C. and Damier, P. (2007) Démence à corps de Lewy et démence associée à la maladie de Parkinson. *La Presse Médicale*, **36**, 1485-1490. https://doi.org/10.1016/j.lpm.2007.04.025

[31] Vernier, T., Desport, J.C., Villemonteix, C., Massoulard, A., Fraysse, J.L., Jésus, P., Fayemendy, P., Arnal-Couderc, M., Guemas, C. and Salacroup, C. (2020) Evaluation du statut nutritionnel de 866 résidents en EHPAD dans le territoire du Limousin, et liens avec la démence et la mobilité. *Nutrition Clinique et Métabolisme*, **34**, 22-23. https://doi.org/10.1016/j.nupar.2020.02.208

[32] Baiyewu, O., Adeyemi, J.D., Ikuesan, B.A., *et al.* (2000) Dementia and Depression in the Elderly Living in South-Western Nigeria. *Nigerian Medical Journal*, **39**, 28-31.

[33] Baiyewu, O., Adeyemi, J.D. and Ogunniyi, A.O. (1997) Psychiatric Disorders in Nigerian Nursing Home Residents. *International Journal of Geriatric Psychiatry*, **12**, 1146-1150. https://doi.org/10.1002/(SICI)1099-1166(199712)12:12<1146::AID-GPS679>3.0.CO;2-X

[34] (2011) Maladie d'Alzheimer et maladies apparentées: Diagnostic et prise en charge. https://www.has-sante.fr/upload/docs/application/pdf/2011-12/recommandation_maladie_d_alzheimer_et_maladies_apparentees_diagnostic_et_prsie_en_charge.pdf

[35] Zhang, P., *et al.* (2019) Senolytic Therapy Alleviates Associated Oligodendrocyte Progenitor Cell Senescence and Cognitive Deficits in an Alzheimer's Disease Model. *Nature Neuroscience*, **22**, 719-728. https://doi.org/10.1038/s41593-019-0372-9

[36] Touverey, B., Hanon, C. and Pellerin, J. (2009) Psychothérapies dans les démences. *Annales Médico-Psychologiques*, *Revue Psychiatrique*, **167**, 210-214. https://doi.org/10.1016/j.amp.2009.01.019