Full Length Research Paper

Prevalence of cognitive impairment varied with sex and education in an elderly population 60 years and over living in the commune of Diourbel, Senegal

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With the aging of the population, cognitive impairment is becoming frequent. Thus, a study was conducted to estimate its prevalence in a Senegalese elderly population 60 years and over living in the commune of Diourbel, Senegal. A cross sectional study was conducted from July to august 2007 in a population of elderly aged 60 years and over living in the commune of Diourbel, Senegal to screen for cognitive impairment. Data on sociodemographic characteristics, lifestyles, physical activity, social network, medical history, familial history of dementia were collected with a structured questionnaire. Interviews were completed with a clinical exam and neuropsychological testing with the Test of Senegal. Cognitive impairment was defined as a score of ≤ 28/39 with the Test of Senegal. The population (584 elderly) had a mean age of 69.5 years (±7.3), was mostly female (54%), married (74.6%), and illiterated (80.1%). Social network was poor, alcohol and smoking rare. Hypertension (58%), arthritis (45.9%), gastro-intestinal diseases (38.2%), anemia (29.5%) and cataract (22.9%) were the main health conditions reported. History of dementia was reported by 26.2%. Prevalence of cognitive impairment was 20.7% (95% CI: 17.7%-23.7%). This prevalence was more frequent among female and illiterated elderly persons. Prevalence of cognitive impairment was high and more frequent in female and illiterated elderly population living in the commune of Diourbel, Senegal.

Key words: Cognitive Impairment, Prevalence, Elderly population, Diourbel, Senegal.

INTRODUCTION

Cognitive impairment is a major cause of dementia and associated disability and care dependence in aging population. In 2000, the estimated number of dementia cases was 25.5 millions people representing 0.4% of the worldwide population. Moreless 52% of the cases lived in developing countries. This number will be 63 millions in 2030 and 114 millions in 2050. The greatest increase will occur in developing countries from 13.3 millions of cases in 2000 to 84 millions in 2050 (Wimo et al., 2003). Dementia constitutes a real social, economic and medical burden. Its prevalence increases with age and sex (Hendrie et al., 1995). However several population-based studies were conducted in developed countries to better understand the epidemiology of this new epidemic, few ones have been done in Africa (Touré et al., 2010). In Dakar, Senegal, the prevalence of cognitive impairment was estimated at a rate of 10.8% in a population of elderly aged 55 years and over (Coume et al., 2012). By the time, the Senegalese population is ageing. This means that the number of people having cognitive impairment will increase also. Considering the economic cost of cognitive impairment care, Senegal is not able to afford such cost. It is important to have reliable information on

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the prevalence of cognitive impairment to plan for more accurate provision of social and medical services for the elderly population. Estimating prevalence can also help to plan for prevention program. Most of studies measuring prevalence of cognitive impairment were conducted in defined, characterized populations living in urban areas or in institution. Studies on cognitive impairment in elderly population living in rural or provincial settings are rare in Africa (Farrag et al., 1998; Guerchet et al., 2009; Hendrie et al., 1995). Thus, a study was conducted in the commune of Diourbel, a province of Senegal to estimate the prevalence of cognitive impairment in an elderly population aged 60 years and over. By the way, we assessed the variability of this prevalence according to sociodemographic characteristics of the population. Our hypothesis was a low prevalence of cognitive impairment (5%) in that province regarding the social structure of the population.

METHODS

The Site of The Study. The Province of Diourbel, Senegal

The commune of the same name was created since 1918. It had an area of 36.18 Km^2. The estimated population was 104 358 inhabitants in 2007 of whom 5218 were 60 years and over. The commune of Diourbel is located 144 km far from Dakar, the capital of Senegal. It is characterized by agricultural activities and trading. Religious belief is very important through Mouridism, an Islamic sect. Social networking and hardworking are the main principles of living.

The Study Population

The study population was composed of Senegalese elderly persons aged 60 years and older who lived in the 4 headquarters of the commune of Diourbel, Senegal. Were excluded from this study any elderly who was less than 60 year old or wasn't able to fulfill interview with the tool utilized (aphasia, delirium, coma, extreme visual and auditory impairment, cancer at terminal phase).

Data Collection

The study was cross-sectional. From July to August 2005, 584 elderly persons aged 60 years and over were interviewed with the questionnaire "Aging in Senegal". The screening interview questionnaire "Aging in Senegal" contained the following components: sociodemographic variables (age, sex, marital status, education), medical history (vascular diseases [hypertension, heart diseases, vascular peripheral disease, stroke, diabetes], respiratory

diseases, arthritis, cancer/benign tumour, Parkinson disease, epilepsy, genitor-urinary disease, cataract, glaucoma, hearing impairment, digestive disease (gastritis, constipation), anaemia, thyroid disease, head trauma, bone fracture), familial history of memory impairment, lifestyles (smoking, alcohol consumption, walking), social network (social ties with spouse, children, brothers/sisters, friends; frequency of weekly contacts with children, brothers/sisters, friends; members of community association, member of religious association), the patient's functional autonomy (Fillenbaum, 1985) and the neuropsychological tests with the Test of Senegal (Touré et al., 2008).

Each patient underwent a screening interview with the questionnaire "Aging in Senegal". This interview was conducted concomitantly with the informant and the patient. It aimed to collect data related to sociodemographic, lifestyle, past medical history and social network and to screen for neuropsychological performance with the Test of Senegal.

The Test of Senegal is a neuropsychological test to screen for dementia which explores several cognitive domains: orientation (0-8 points), memory (0-24 points), attention (0-2 points), language (0-2 points), and executive functions/praxis (0-3 points). The total score is 0-39 points. It was developed and validated with a sensitivity of 93.1%, a specificity of 89.6%, a positive predictive value of 93.1%, a negative predictive value of 92.8 % at a cut-off point of 28/39. It is reliable with a kappa of 0.82. Age and education has no effect on its performance (Touré et al., 2008).

This study was conducted by 7 medical doctors and 9 nurses who were trained for the work.

Variables of Studies

Cognitive impairment was defined by a score equal or less than 28/39 with the Test of Senegal. The other variables were as follow:

- ❖ sociodemographic characteristics: Age in 6 categories [60-64 years, 65-69 years, 70-74 years, 75-79 years, 80-84 years, 85 years and plus], sex (male, female), marital status (married, not married), education (yes, no);
- ❖ past medical history and familial history of cognitive impairment;
- ❖ life style divided into smoking habit (yes, no), alcohol consumption (yes, no) and walking (yes, no).
- ❖ social network. We computed three indexes: diversities of social ties (score 0-4), frequency of weekly contacts with relatives (score 0-6) and social integration (0-3). Diversity of social ties were computed by summing "Having a spouse or husband, children, brothers/sisters and friends" and categorized into 3 levels: 0-2 ties, 3 ties and

4 ties. Frequency of weekly contacts with relatives were obtained by summing the frequency of weekly contacts with children, brothers/sisters and friends and categorized into 4 levels: 0-3 weekly contacts, 4 weekly contacts, 5 weekly contacts, 6 weekly contacts. Social integration was computed by summing "being member of community association, being member of religious association, frequentation of religious places" and categorized into 3 levels: 0-1 tie, 2 ties and 3 ties.

Ethical Consideration

Before the start of the study, informed consent was obtained from the patient and/or his/her relative. Each person had a medical consultation by a medical doctor before the interview. Whenever a disease was diagnosed, the patient was referred to the health center for free health care and medication.

DATA ANALYSIS

All the data collected were analysed using the SPSS-13.0 version package for Windows. Univariate analyses to compute means, standard deviation, frequencies were first realized. Bivariate analysis enabled to compare prevalence of cognitive impairment according to sociodemographic variables. Chi Square test was utilized and results expressed with a confidence interval of 95%.

RESULTS

The whole population (584 participants) had a mean age of 69.5 years (±7.3) with a range of 60 to 90 years. Almost 28% were in the range 60-64 years. They were mostly female (54%), married (74.6%), and illiterated (80.1%). They had ever smoked cigarette (17.70%) and consumed alcohol (6.7%). Walking was the main physical activity (65.8%). The elderly population had a low diversity of ties (62.7% had 1 tie). Frequency of contact with relatives was variable. In fact, 170 (29.1%) had 0-3 weekly contacts while only 161 (27.57%) had 6 weekly contacts. However, social integration was rare with 303 (51.8%) having 0-1 tie (Table 2). Hypertension (58%), arthritis (45.9%), gastro-intestinal diseases (38.2%), anemia (29.5%) and cataract (22.8%) were the main health conditions reported in the past medical history. However, 153 (26.2%) and 127 (21.7%) reported a familial history of memory and psychiatric disorders respectively (Table 3). During the study, 121 elderly had cognitive impairment giving a prevalence of 20.7% (95% CI: 17.7%– 23.7%). In the bivariate analysis, cognitive impairment varied with sex (p<0.000) and education (p<0.016). In fact, the prevalence of cognitive impairment was higher among female and illiterate elderly population.

However, it did not vary with age or with marital status (Table 4).

DISCUSSIONS

Prevalence of cognitive impairment in a magnitude of 20.7% varying with sex and marital status was observed in a population of elderly living in the commune of Diourbel, Senegal. This prevalence is higher compared to what was expected in this population. But it confirms the occurrence of cognitive impairment among elderly persons in a variable prevalence either in institutions or in populational setting. Unfortunately, studies on cognitive impairment are rare in the African continent. However, several ones were conducted in Europe, USA and Asia too. In Brazil, a prevalence of 34% was observed in a population of elderly 60 years and over living in Bage, Rio Grande do Sul (Holz et al., 2013). It was 4.5% in Egypt in Assuit Valley (Farrag et al., 1998) during a populational survey among 2000 elderly persons aged 60 years and over, 7% in Shanghai-China (Yao et al., 2010). In Mexico, an estimated prevalence of 13.8% was observed (Ortiz et al., 2012) while it was 15.7% in Indianapolis-USA (Callahan et al., 1995). In Italy, prevalences of 5.1% and 11.3% were observed in different populations (De Ronchi et al., 2004; 2005). The prevalence of cognitive impairment observed in our population is higher than what we expected considering its sociocultural characteristics (5%). Several factors could explain it: low social network, poverty and illiteracy.

In fact, social network was not so important in the elderly of the commune of Diourbel: 29.1% of the elderly had few weekly contacts with relatives and 51.8% 0-1 tie with relatives (Table 2). Compared with what was expected considering the religious belief, we can say that elderly of Diourbel seem to be living in loneliness. Maybe immigration or rural exodus could explain this statement. Whatever the cause, low social network is associated with the occurrence of cognitive impairment as stated by several studies conducted worldwide (Fratiglioni et al., 2000; Holtzman et al., 2004; Saczinski et al., 2006; Zunzunegui et al., 2003). The other factors could also be contributing. The commune of Diourbel is one of the poorest in Senegal and illiteracy is very important. These factors are associated with cognitive impairment (Alvarado et al., 2002; Caamaño-Isorna et al., 2006).

Prevalence of cognitive impairment was higher in female elderly which was already observed in Europe (Berr et al., 2005), USA (Edland et al., 2002), Brazil (Holz et al., 2013) and China (Yao et al. 2010). High life expectancy, low literacy and poverty in female could explain this higher prevalence. However, cognitive impairment occur either in male or female elderly.

Several studies have highlighted the association between illiteracy and cognitive impairment. In our study, prevalence of cognitive impairment was higher among illi-

terated elderly confirming what was already stated worldwide (De Ronchi et al., 2005; Gatz et al., 2006; Holz et al., 2013).

This study allows an understanding of the magnitude of cognitive impairment in a Senegalese province, Diourbel. Screening for cognitive impairment is important because it can help to estimate its prevalence and identify its risk factors too. In fact, patients with cognitive impairment are at risk for developing dementia. Although rates of progression are widely different across studies and populations, it has been found that the rate at which patients with cognitive impairment progress to dementia is about 70% over a period of 5 years (Taragano et al, 2008). Thus, its early detection is of great importance to develop and implement preventive strategies before conversion to dementia.

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Annexes

Table 1. Sociodemographic characteristics and lifestyle of the study population (n=872).

Variables	Frequency (n)	Percentage (%)
Age		
60-64 years	164	28
65-69 years	152	26
70-74 years	116	20
75-79 years	75	12.8
80-84 years	57	9.8
85 years +	20	3.4
Sexe		
Female	313	53.6
Education (No)	468	80.1
Marital status		
Married	436	74.6
Had ever smoked (Yes)	103	17.7
Had ever consumed alcohol (Yes)	39	6.7
Walking (Yes)	384	65.8

Table 2. Social network of the study population.

Variable	Frequency	Percentage (%)
Diversity of ties with relatives		
Mean (± SD) : 3.6 (0.6)		
Minimum: 0		
Maximum: 4		
0-1 tie		
2-3 ties	374	64.1
4 liens	205	35.1
Weekly contacts with relatives	5	0.8
Mean (± SD) : 5.2 (1.1)		
Minimum: 0		
Maximum: 6		
0-3 contacts	170	29.1
4 contacts	147	25,2
5 contacts	106	18.1
6 contacts	161	27.6

Table 3. Past medical history of the elderly.

Variables	Frequency	Percentage (%)
Hypertension (Yes)	292	50
Arthritis (Yes)	268	45,9
Heart disease (Yes)	69	11,8
Stroke (Yes)	12	2,1
Diabetes (Yes)	27	4,6
Respiratory disease (Yes)	77	13,2
Cancer or benign tumor (Yes)	8	1,4
Parkinson disease (Yes)	21	3,6
Epilepsy (Yes)	8	1,4
Genito –urinary disease (Yes)	66	11,3
Cataract (Yes)	133	22,8
Glaucoma (Yes)	66	11,3
Hearing Impairment (Yes)	118	20,2
Digestive problem (Yes)	223	38,2
Anemia (Yes)	172	29,5
Thyroid problem (Yes)	17	2,9
Head trauma (Yes)	59	10,1
Family history of memory disorder (Yes)	153	26,2
Family history of psychiatric disorder (Yes)	127	21,7

Table 4. Prevalence of cognitive impairment according to sociodemographic characteristics.

Variable	Frequency	Prevalence	P value
Age			0.13 (NS)
60-64 years	29	17.7	
65-69 years	29	19.1	
70-74 years	25	21.5	
75-79 years	17	22.7	
80-84 years	12	21.0	
85 years and over	9	45.0	
Sex			0.000*
Male	38	4.5	
Female	83	14.2	
Education			0.016*
Yes	13	12.1	
No	108	22.6	
Marital status			0.08 NS
Married	83	19.0	
No married	38	25.7	

NS= Not statistically significant
* Statistically significant