
SOCIO-DEMOGRAPHIC RISK FACTORS IN PATIENTS WITH MILD COGNITIVE IMPAIRMENT CONVERTED TO DEMENTIA

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Abstract

The socio-demographics factors are recognized in medical literature as risk factors for mild cognitive impairment (MCI) and its conversion in dementia. This study identifies the demographics risk factors in conversion of the MCI patients in dementia. The study was effectuated in Sibiu. 365 patients with MCI over 65 years were evaluated for 4 years. In this period we identified the total rate of conversion in dementia being 43.8%, the rate of conversion in Alzheimer dementia (AD) being 18.9%, the rate of conversion in Vascular dementia (VD) being 11.8% and in mixed dementia (MD) 13.1%. The conversion in dementia is dependent of age and it has a linear increasing. The feminine gender and low level of training present a high relative risk of conversion into Alzheimer dementia of 2.07, respective 4.08.

Keywords: socio-demographic factors, mild cognitive impairment, dementia

1. Introduction

People were endowed with memory at the time of their creation to be united with God through their minds and hearts to always remember Him. "That is why we have the ability to remember to keep Jesus Christ in us" said Saint Nicholas Cabasilas. The concept of MCI was used once with the ageing of the population starting from the idea that the loss of memory is more frequently in older people [1]. MCI is a syndrome defined as cognitive decline greater than expectancy determined by age and educational level of the individual, but does

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not interfere with daily activities [2]. Prevalence in population studies conducted, of epidemiological type, is between 3-19% in adults over 65 years. A number of people with MCI remain stable or regain cognitive normality, but more than a half, progress to dementia over the next five years, and that's why a number of authors state that MCI can be considered a risk factor for dementia. MCI is differentiated in two basic subtypes: the amnesic MCI and non-amnesic MCI. Amnesic MCI is defined as MCI with memory loss, while non-amnesic MCI represents MCI with little or no memory loss, but with other cognitive function impairment (language, visuospatial ability, executive function). The amnesic type of cognitive impairment has an increased risk of conversion to Alzheimer's dementia. Petersen et al. states that 80-95% of patients with mild cognitive impairment will develop dementia during their life [2, 3]. Studies of conversion from MCI to dementia suggest a linear progression over time and each MCI subtype is associated with an increased risk for a particular type of dementia [4]. It was estimated that 35.6 million people lived with dementia worldwide in 2010, with numbers expected to almost double every 20 years, to 65.7 million in 2030 and 115.4 million in 2050. In 2010, 58% of all people with dementia lived in countries with low or middle incomes, with this proportion anticipated to rise to 63% in 2030 and 71% in 2050 [5]. The aim of this study was to determine if the socio-demographics factors are the risk factors in patient converted to MCI in dementia.

2. Method

We evaluated consecutively for a 3-year period, between March 2008 until October 2010, a number of 365 patients with MCI from Sibiu, Romania, to observe conversion to dementia in these patients. We considered the MCI type presented. I did the evaluation of these patients in Sibiu between March 2008 and October 2010, each patient being evaluated annually for three years. In building up the lot we have considered inclusion and exclusion criteria. Inclusion criteria: subjects of both sexes aged ≥ 65 years, subjects who reported impaired retrieval, retrieval disorders which are highlighted by MMSE screening test in accordance with CDR 0.5 and the subjects' willingness to participate in this assessment. Exclusion criteria: subjects with known diagnosis of dementia, subjects with known diagnosis of stroke or cerebral haemorrhage, subjects with known neurodegenerative disease, mental illness known subjects, subjects with severe somatic diseases, unstable or life-threatening predictable, subjects with hyper or hypothyroidism, subjects with a history or chronic use of ethanol or drug abuse type, subjects who consume daily drugs that can interfere with their alertness. The diagnosis of MCI was based upon Petersen criteria [3].

We have established the diagnosis of dementia in accordance with the DSM IV criteria [6]. We conducted a neuropsychological evaluation using the MMSE (Mini Mental State Examination). MMSE test is a screening test of cognitive function and cannot be used as a diagnostic test [7]. We used Hachinski criteria (\leq HIS AD 4 $<$ HIS $<$ 7, mixed dementia, vascular dementia

HIS ≥ 7 [6, 8, 9]) to make the distinction between the mixed vascular dementia and Alzheimer. The patients were evaluated annually for a period of three years, with a total of four basic assessments. The diagnosis of mild cognitive impairment was determined from at least two evaluations of each patient. The statistic precession of data was reviewed with MedCalc. The impact of socio-demographics risk factors was quantified using relative risk.

3. Results

The study group was homogenous in terms of sex, out of the 365 evaluated patients, 194 male patients (53.2%) and 171 female patients (46.8%). The average age was 73.2 years, with the following age groups distribution: 34.5% in the 65-69 year group, 27.1% in the 70-74 year group, 21.9% in the 75-79 year group, 10.9% in the 80-84 year group, and 5.6% over 85 years. In terms of level of education, 27.9% of patients had less than 8 years of study, 44.4% had between 8-12 years of study and 27.7% had higher education (Table 1).

Table 1. Distribution of patients by the age group and the pathology presented.

| The age group | 65-69 years | 70-74 years | 75-79 years | 80-84 years | 85-89 years | ≥ 90 years |
|-------------------------|-------------|-------------|-------------|-------------|-------------|-----------------|
| Non-converted | 93 (45.4%) | 59 (28.8%) | 38 (18.5%) | 11 (5.4%) | 3 (1.5%) | 1 (0.4%) |
| AD | 19 (27.5%) | 17 (24.6%) | 16 (23.2%) | 13 (18.8%) | 3 (4.3%) | 1 (1.4%) |
| DV | 7 (16.3%) | 8 (18.6%) | 13 (30.2%) | 8 (18.6%) | 5 (11.6%) | 2 (4.6%) |
| DM | 7 (14.6%) | 15 (31.2%) | 13 (27.1%) | 8 (16.7%) | 2 (4.2%) | 3 (6.2%) |
| Numeric distribution | 126 | 99 | 80 | 40 | 13 | 7 |
| Percentage distribution | 34.5% | 27.1% | 21.9% | 10.9% | 3.6% | 1.9% |

The level of patients' education was measured in three groups according to the number of years of study: less than 8 years of study, 8 to 12 years, more than 12 years of study. In terms of level of education, 27.9% of patients had less than 8 years of study, 44.4% had between 8-12 years of study and 27.7% had higher education. These three categories of degrees of education were taken into consideration due to the fact that several studies noted that the low level of education constitutes a risk factor for Alzheimer's dementia, but also for the mild cognitive impairment and its conversion into dementia. Out of the total number of 365 evaluated patients, 199 patients (54.5%) had cognitive impairment of amnesic type, while 166 patients (45.5%) had cognitive disorder of non-amnesic type. The evolution of patients examined during the 3 years of observation, was the following: 56.0% of patients remained in the stage of mild cognitive impairment (205 patients) and they constituted the residual patients study group throughout the MCI analysis. 18.9% (69 patients) showed progression to Alzheimer dementia constituted the group study patients with Alzheimer dementia. 11.8% (43 patients) had progression to vascular dementia

and constituted the group study patients with vascular dementia. 13.2% (48 patients) had progression toward mixed dementia and constituted the group of patients with mixed dementia. In this study, we enrolled patients over 65 years old and the average age at the enrolled moment in the study was 73.2 years old.

Monitoring the conversion in dementia, the average ages were different having the following representation:

- for the patients with Alzheimer Dementia the average age was 74.1;
- for the patients with Vascular Dementia the average age was 76.9;
- for the patients with Mixed Dementia the average age was 75.8;
- for the patients non-converted the average age was 71.5.

From the patients with amnesic MCI, 24.6% progressed toward AD, 10.0%, toward DV and 16.6% toward DM, while the patients with non-amnesic MCI had the following development: 12.0% arrear of MCI, 13.8% had DV, 9.0% had DM. The conversion of the analyzed group of patients was different in terms of the period in which the conversion occurred and developed pathology. Thus in the first year, 20.2% of patients have dementia with the following distribution: 11 patients with Alzheimer's dementia (28.9%), 11 with vascular dementia (28.9%) and 16 with mixed dementia (42.2%). In the second year, 34.6% of patients have dementia with the following distribution: 29 with Alzheimer's dementia (44.6%), 17 with vascular dementia (26.2%) and 19 with mixed dementia (29.2%). In the third year 45.2% of patients have dementia, with the following distribution: 29 with Alzheimer's dementia (34.1%), 43 with vascular dementia (50.6%) and 13 with mixed dementia (15.3%). In the analyzed group, the total rate of conversion to dementia was of 43.8%, with different rates for each type of dementia. The overall conversion rate in Alzheimer's dementia was of 18.9% with an average annual rate of 6.3%. The overall conversion rate in vascular dementia was 11.8% with an average annual rate of 3.9%. The overall conversion rate in mixed dementia was 13.1% with an average annual rate of 4.4%.

4. Discussion

It is recognized that many elderly patients have mild cognitive impairment (MCI), but not all patients with MCI, develop dementia. The systematic screening of the cognitive disorder in elderly asymptomatic patients is not recommended, because it provides insufficient data [2, 9]. The ongoing debates about the MCI type which determine the progression to dementia showed that the amnesic MCI type is less incriminated [10]. The American Academy of Neurology Petersen suggests that patients with mild cognitive impairment should be recognized and monitored from viewpoint of cognitive and functional decline, as they have an increased risk of dementia [3].

Maioli F et al. [11], reports that from the patients with MCI, on an average period of 1.21 ± 0.61 years, 53.8% remain in the same health state and 17.3% come to normal during the follow up period. In this study, 28.8% of the patients presented dementia at the end of the follow-up period with the following

repartition: 53.3% convert into AD, 33.4% into Alzheimer with cerebrovascular disease and 13.3% fronto-temporal dementia. The global conversion rate was of 23.8% per year [11]. The Canadian Study of Health and Aging reports the prevalence of the cognitive disorder in the absence of the dementia at 16,8% of the persons over 64 years, while the Italian Longitudinal Study of Aging finds a prevalence of 10.7% for the same age group. The prevalence of the dementia in these studies was 8% respectively 5.5% [12, 13]. Anja Busse et al [4]. asserts on the basis of the dates in the Longitudinal Study of the Aged (LEILA 75+) that, approximated 60-65% of the patients with MCI, aged 75 years and over, develop dementia, clinically manifested during lifetime. In this study, at 18 months of monitoring, the conversion rate is double comparatively with the further follow up, approximated 20% convert to dementia at 18 months, at 6 years of monitoring only 20% of the participants with MCI do not present dementia, other 30% die without dementia and 50% develop dementia. This observation is in opposite of the literature data according to which the progression of dementia is linear [4]. Petersen in 2003 reported that at 6 years of follow-up period, 60% of the patients with MCI present dementia with a linear rate of progression [3].

In the analyzed lot, the patients with the enrolment over 65 years, 43.8% of them evolve to dementia on a three years period of follow up. The level of education is pursued in several studies of conversion from MCI to dementia. In most studies are pursued several variable categories: less than 8 years of educations 8 to 12 years of educations, more than 12 years of educations. In 11 of 15 evaluated studies it was found an increasing growth of the Alzheimer disease associated to a low educational level [14, 15].

Recently a meta-analysis calculated the relative risk for dementia in accordance with the level of education. There are certain evidences that the low educational level is a risk factor for the AD, but the exact mechanism to specify this is unknown. There are researches according to which is expressed the protective role of the education in terms of cognitive reserve [16]. Through the relative risk calculation, in the our study we identified an increased risk of developing Alzheimer's disease, associated to the reduced level of instruction (under 8 years) of 4.08 in the conditions of a relative risk of conversion in dementia at this group of 1.81, with values of this risk of 0.53 and 2.35 for vascular dementia, respectively mixed dementia. For an average level of instruction (8-12 years) in our study the relative risk of conversion in dementia is of 0.75 (0.56 – AD, 0.97 – VD, 0.76 – MD). In the group considered with a high level of instruction, the conversion relative risk in dementia was of 0.70 (0.15 – AD, 1.38 – VD, 0.53 – MD).

A meta-analysis of 12 studies suggests that the incidence rate of the dementia is dependent of the age, the risk of developing dementia growing with the age. In this meta-analysis the authors tried to objective the results through the framing of the studies in different levels of observation in accordance with the used study criteria. Part of the studies used in the meta-analysis included patients with mild dementia, others with moderate or severe dementia [16]. In our study, the progression rate to dementia in general, but also in the Alzheimer

disease particularly, admits a linear rate progression reported to the age. The estimation of the relative rate of conversion reported to the age, supplementary confirms this observation, proving a linear growth with age, for dementia in general and for Alzheimer dementia in particular. In our analyzed lot, the increased relative risk of conversion to dementia, corresponds to the group of age over 85 years.

At every four seconds around the world, someone is diagnosed with dementia. According to Alzheimer's Disease International, there are 7.7 million new cases of dementia each year. Already 58% of people with dementia live in developing countries, but by 2050 this number will rise to 71% (18). Our study showed a high risk of conversion in dementia of the patients with MCI: amnesic and non-amnesic.

Recognition of mild cognitive impairment (MCI), as a transition phase between healthy ageing and dementia is important in the investigation of treatments at secondary prevention of dementia. Identifying the loss of memory at the elderly patients, can be reclaimed from the patient or from his/her belonging. This aspect is achieved easily in the patient's family, but it can be observed by the social assistance, too. Using an evaluation system which has as the main idea going to the patient's house frequently by the social assistance institutions make early diagnosis of memory loss and early establish of optimal therapeutic measures.

5. Conclusions

In this study, the age was a very important risk factor in the conversion of the patients with MCI in dementia. They presented a linear conversion dependent of the increasing of the age.

The feminine gender associates with an increased risk of conversion from MCI in dementia (Alzheimer disease, followed by vascular dementia). The masculine gender associates with a high risk of conversion patients from MCI in mixed dementia.

The low level of training is a high risk factor, in the conversion of patients with MCI in AD and has a relative risk of 4.08 compared with the high level of training, which risk was of 1.15.

In the present study 71% of the patients with Alzheimer disease came from the patients with amnesic MCI and 46.5% from the patients with vascular dementia.

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