*Interdisciplinary Rehabilitation / Rehabilitación Interdisciplinaria*. 2022; 2:12
doi: 10.56294/ri202212

ORIGINAL

# Prevalence and risk associations of mild cognitive impairment in community-dwelling elderly people

# Prevalencia y asociaciones de riesgo del deterioro cognitivo leve en personas mayores de una comunidad

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**Cite as:** Espinosa Ferro Y, Mesa Trujillo D, Llibre JJ. Prevalencia y asociaciones de riesgo del deterioro cognitivo leve en personas mayores de una comunidad. Interdisciplinary Rehabilitation / Rehabilitación Interdisciplinaria. 2022; 2:12. https://doi.org/10.56294/ri202212

**Submitted:** 16-09-2022 **Revised:** 04-10-2022 **Accepted:** 27-10-2022 **Published:** 28-10-2022

**Editor:** Prof. Dr. Carlos Oscar Lepez

## ABSTRACT

**Introduction:** mild cognitive impairment includes for diagnosis memory complaints, preferably corroborated by an informant; memory impairment according to age and education; preserved general cognitive function; intact activities of daily living; and no evidence of dementia.
**Objective:** to determine the prevalence and risk associations of mild cognitive impairment in community-dwelling elderly.
**Methods:** an observational, descriptive, cross-sectional study was conducted from January to December 2019. The population consisted of 150 elderly people aged 65 years old from the family medical office No.1 of Los Palacios municipality.
**Results:** female sex, age group 80 years and older, medium level of schooling, marital status without a partner, physical inactivity, hypertension, smoking, depression and insomnia were predominant and there were also affectations in immediate and mediate memory. Age and history of stroke were risk factors with statistical significance, while educational level was a protective factor.
**Conclusions:** the preservation of cognitive functions is a necessary condition to develop an independent and productive life, so intervention strategies are needed to improve the quality of life of the elderly.

**Keywords:** Elderly; Mild Cognitive Impairment.

## RESUMEN

**Introducción:** el deterioro cognitivo leve incluye para su diagnóstico quejas de memoria, preferiblemente corroboradas por un informante; afectación de la memoria según edad y educación; función cognitiva general preservada; actividades de la vida diaria intactas; y no evidencia de demencia.
**Objetivo:** determinar la prevalencia y asociaciones de riesgo del deterioro cognitivo leve en personas mayores conviventes de una comunidad.
**Métodos:** investigación observacional, descriptiva, de corte transversal comprendida en el periodo de enero a diciembre 2019. La población fue de 150 adultos mayores de 65 años del consultorio médico de la familia No.1 del municipio Los Palacios.
**Resultados:** predominó el sexo femenino, el grupo de 80 años y más, el nivel medio de escolarización, el estado marital sin pareja, la inactividad física, la HTA, el tabaquismo, la depresión y el insomnio existiendo además afectaciones en la memoria inmediata y mediata. Resultaron la edad y el antecedente de ictus factores de riesgo con significación estadística, mientras que el nivel educacional resultó ser un factor protector.

**Conclusiones:** la preservación de las funciones cognitivas es una condición necesaria para desarrollar una vida independiente y productiva por lo que se necesita de estrategias de intervención para mejorar de la calidad de vida de los adultos mayores.

**Palabras clave**: Adulto Mayor; Deterioro Cognitivo Leve.

## INTRODUCTION

In Cuba, the phenomenon of population aging is also progressively increasing and holds significant implications. The figures from the end of 2017 reveal that there are 2 246 799 older adults (aged 60 years and older), which accounts for 20,2 % of the population. The province of Pinar del Río has a population of 41 386 older adults, representing an aging rate of 21,7 %. Los Palacios is ranked fourth among municipalities in terms of its population aged 60 years and older (19,7 % of its total population). These figures closely correspond with those reported at the provincial level.[1]

As individuals age, cognitive functions often experience significant decline, leading to potential negative impacts on the quality of life for older adults. [2]

Mild cognitive impairment (MCI) refers to individuals experiencing cognitive decline that is not severe enough to be diagnosed as a dementia syndrome. In daily clinical practice, MCI cases are common, and it is critical for healthcare providers to accurately describe and characterize them. The significance of this syndrome is emphasized by the yearly advancement to Alzheimer's disease (8 to 15 %) of individuals diagnosed, in contrast to the general population where only 1 to 2 % undergo this progression.

MCI presents in three forms: amnestic, where the patient faces memory issues while retaining other cognitive functions; mild cognitive impairment that impacts multiple cognitive domains; and lastly, a form that affects only a specific cognitive domain other than memory, such as language or executive function, among others. The amnestic form is more likely to progress to Alzheimer's disease. The multiple-domain cognitive form could indicate normal aging or Alzheimer's disease. Lastly, the single-domain form, affecting cognitive domains other than memory, is more suggestive of potential frontotemporal dementia, vascular dementia, or Lewy body dementia.[3]

In Pinar del Río province, no prior research has been conducted, making this a pioneering study. The results could be used as a benchmark for comparing other regions within the country and could promote the development of health education strategies. Therefore, we are exploring the relationship between the prevalence and risk factors associated with mild cognitive impairment in older adults from Medical Office No. 1 in the municipality of Los Palacios, in relation to our overall objective. In simpler terms, we aim to determine the prevalence and risk factors associated with mild cognitive impairment in older people living in a community.

## METHODS

*Type of study*

An observational, descriptive and cross-sectional study was conducted to establish the prevalence and risk factors associated with MCI among older adults in a community. From January to December 2019, we visited the Family Medical Office No.1 in the Elena Fernández Castro Polyclinic, Municipality of Los Palacios, Pinar del Río province. A survey was conducted that included all adults who aged 65 years and older.

*Definition of study population*

There were a total of 150 individuals aged 65 years and older registered with the Medical Office (N=150).

*Inclusion criteria*

- Informed consent to participate in the study.
- Adults aged 65 years and older residing within the health area under the jurisdiction of Family Medical Office No. 1 in the Elena Fernández Castro Polyclinic, Municipality of Los Palacios.
- Subjective memory impairment confirmed by a reliable informant.
- Memory impairment objectively assessed by tests with normative data for age and educational level.
- Normal overall cognitive function.
- Independence in activities of daily living (ADLs) and instrumental activities of daily living (IADLs).
- Absence of dementia (Annex 1).[4]

*Exclusion criteria*

- Participants who do not meet the above inclusion criteria.
- Adults who, despite having given their consent, have caregivers who do not consent to the interviews

or to the administration of the neuropsychological test battery.

*Data collection techniques*

The data were collected through instruments validated in epidemiological studies across 26 countries, including Cuba, as part of the international protocol for the 10/66 Dementia Research Group. Subsequently, this data were stored in a database for storage, organization, and processing, utilizing EPIDAT version 3.0.[5]

*Instruments used*

- Housing questionnaire: Aimed to collect information about possessions and spending habits of older individuals, as well as the sociodemographic factors of both the older adult and their household members.
- Cognitive test: This includes a set of tests called the Community Screening Scale for Dementia, which includes an oral fluency test and the repetition of a modified 10-word list from the Consortium to Establish a Registry for Alzheimer's Disease (CERAD). It also includes the Continued Community Screening Scale for Dementia. The goal is to check functional and cognitive decline.
- Geriatric Mental State Inventory (B3 version): A structured clinical interview with 154 items organized into 30 sections. It employs a computerized algorithm to draw conclusions about general psychopathological conditions in older individuals, facilitating the identification of organicity (indicative of possible dementia), depression, anxiety, and psychosis.
- Sociodemographic and risk factor survey: It consists of two versions (one for the older adult and another called "participant proxy" for caregivers). The main goal is to assess age, current situation, social environment, socioeconomic status, well-being, impairment, disability, lifestyle, and use of National Health System (NHS) services at different levels.
- Informant questionnaire: It comprises three modules. The initial module provides details about the informant, the second one collects information about caregiving arrangements for the older adult and their impact on the caregiver, and the third module provides initial clinical data about the older adult from the informant's perspective. This module implements the Community Screening Instrument for Dementia (CSI-D) to evaluate the presence of cognitive and functional impairment.
- Neuropsychiatric Inventory–Questionnaire (NPI-Q): This is a short version of the Neuropsychiatric Inventory (NPI), validated in Spanish. It has been the most used scale in the literature to report psychiatric alterations in geriatric populations. This scale, completed by the caregiver, evaluates the occurrence (present/absent) and severity (mild/moderate/severe) of neuropsychiatric symptoms experienced in the past month, along with the level of stress (none/minimal/mild/moderate/severe/extreme) caused by each of these symptoms in the caregiver.[6]
- Physical and neurological examination: It included measuring blood pressure and pulse, taking anthropometric measurements, assessing primitive and tendon reflexes, evaluating ataxia, praxis, muscle tone, trophism, coordination, motility, gait, and conducting hearing and vision assessments. Various instruments such as a dynamometer for strength assessment, a spirometer, and the Snellen chart for vision evaluation were employed. Interview with a family member, caregiver, or reliable informant who provides information about changes in the patient's functional and intellectual activity.

*Methods of data processing and analysis*

The collected results were entered into the SPSS Statistics software, version 21.2. This allowed us to process the data and generate tables for summarizing the information. The significance level (α) was 0,05. A confidence interval of 95% (p=0,05) and n-1 degree of freedom were prefixed. In an effort to compare the prevalence rate derived from the study subjects with the national prevalence rate, the Poisson distribution model was employed. To calculate the probability of prevalence values using the Poisson model through the standard normal approximation of the number of occurrences, the following expression was used: $Z=x-\theta/;\ \theta\geq10$. Proportion measure as a prevalence rate was used, and served as a point estimation to determine the prevalence in the study group. For the prevalence confidence interval (CI) the expression $P \pm Z1-\alpha/2^*$ was used (95% CI). Triangulation of all the theoretical and empirical information analyzed was performed. The collected data were displayed in contingency tables or cross-tabulations, depending on the type of variable. Summary measures were used for both qualitative and quantitative variables, such as ratio, proportion, percentage, rate, and mean.

In the analysis of the interaction between the predictor and independent variables, logistic regression (explanatory model) was employed through the calculation of the maximum likelihood coefficient, which follows a Chi-Squared (x2) test with 1 degree of freedom. Additionally, a stepwise regression approach was employed as a systematic strategy for variable selection. Prior to this, univariate analysis was integrated to establish potential relationships between the dependent variable and each of the factors studied.[7]

*Ethical considerations*

The entire research was conducted in accordance with fundamental international principles of Medical Ethics that govern scientific investigations involving humans. In this regard, informed consent was obtained from the older individuals within the study population as well as from their primary caregivers.

## RESULTS AND DISCUSSION

In terms of sociodemographic variables, the age group of 80 years and older was the most prevalent (35,13 %), followed by the 70 to 74 years group (27,02 %), the 75 to 79 years group (24,32 %), and the 65 to 69 years group (13,51 %). Female sex predominated with 56,75 %. Middle level education was observed in 35,13 % of the participants, while only 8,10 % had no formal education. 62,16 % are older adults living alone, while only 37,83 % were accompanied.

These findings are consistent with a study conducted in Colombia by Pedraza Linares et al.[8] They did not find any evidence that being married provided a protective effect for individuals with MCI who later returned to a normal state. In their study, Vega Alonso et al.[9] revealed a greater prevalence in divorced or separated individuals (24,7 %) compared to those who had no partner (12,6 %), based on age and sex. These findings had no statistical significance. Concerning their place of origin, the majority (67,56 %) come from rural areas, followed by those born in town (29,72 %). Only a small percentage (2,70 %) was born in the city.

Comparable statistics were discovered in a study conducted in Spain, where out of 729 older individuals, 128 participants displayed MCI, representing 17,6 % of the observed population.[10] However, other results vary in terms of the prevalence rate, as found in the research conducted by Gómez in the Municipality of Playa and by Marisol Monteagudo in Plaza de la Revolución.[11]

In studies conducted among the population of Maracaibo, Venezuela, the results showed that women had a higher proportion of cognitive impairment (82,5 %) compared to men (17,5 %).[12] Another researcher, Bórques Arce[2], in her study of Mexican adults aged 65 years and older revealed that women had a greater likelihood of cognitive impairment and functional dependence. This analysis corresponds with the results found in Patricia Portillo's study involving older adults in Maracaibo. In her study, 7,2 % had no formal education, 33,3 % completed primary education, 41,4 % finished secondary education, and 18,1 % completed university education.[12] Climent Catalá's doctoral thesis revealed that the majority of the participants had completed primary education (63,0 %), followed by 21,1 % with secondary education, 9,0 % being illiterate, and 7,0 % holding higher education qualifications.[10]

Regarding the lifestyle patterns of older adults in the population, smoking was the most common habit (51,36 %). Non-risky drinking before the age of 65 was also prevalent (88,88 %), while 59,5 % of older adults were found to be sedentary. Among vascular risk factors, hypertension was the most prevalent in the population (64,66 %), followed by ischemic heart disease (29,73 %), diabetes mellitus (24,33 %), history of stroke (16,21 %), and lastly, history of head injury (5,41 %). These findings are consistent with the results of another study, which also noted a limited participation in physical and recreational activities among the older adults, mirroring the observations made by Zapata, Delgado, and Cardona.[13]

Similar results were found in the study conducted by Monteagudo Torres, indicating that hypertension and smoking habits were prevalent in 28,5 % of individuals with MCI. Both factors showed significant associations with vascular cognitive impairment. Consistent findings with this study were observed in the research conducted by Ávila Vinueza et al. They noted that the frequency of smoking patients in their study was higher than the one reported in a 2015 study conducted in Jinotega, Nicaragua, and quite similar to the findings in a study conducted in Spain.[14]

Sleep disorders had the highest prevalence rate among risk factors associated with mental health (62,17 %), followed by depression (51,35 %). Loneliness had a lower incidence rate (27,03 %), while anxiety was observed in 24,32 % of cases. In their study, Guarnieri et al. found that more than 50 % of the participants had one or more sleep disorders.[15]

Based on a study, a history of early onset depression increases the risk of dementia in individuals aged 75 years and older by 20 %. If depression has a late onset (at 60 years or older), the risk of dementia increases by 10 %. But if individuals experience depressive episodes in both life stages, the risk can increase by as much as 80 %.[16]

Age and history of cerebrovascular disease emerged as identified risk factors for MCI in the studied population. When it comes to age, as individuals surpass 65 years, the risk of dementia increases by 1,4 times for every 5-year increment, taking into account the influence of sex and educational level, with a prevalence ratio of 1,43 (95% CI 1,08 – 1,89). The history of stroke doubled the probability of MCI, with a prevalence ratio of 2,03 (95% CI, 1,02 – 4,02). A higher educational level showed a protective effect for MCI, with an adjusted prevalence ratio of 0,58 (95% CI, 0,32-1,00). However, our study did not find statistically significant values with regards to female sex, history of diabetes mellitus, hypertension, smoking habits, and being a risky drinker as

the confidence interval includes unity. Risk factors related to mental health did not show a significant statistical association, as the confidence interval included unity.

## CONCLUSIONS

The prevalence of MCI observed in the study population is notably higher in comparison to that found in other studies. The predominant demographic included individuals over 80 years old, females, those with moderate educational levels, individuals who had no partner, and those born in rural regions.

Physical inactivity, smoking and hypertension predominated in the studied population. Depression and insomnia were the most prevalent disorders in the study group. Of the variables examined, age and history of cerebrovascular disease demonstrated a significant association with the probability of developing MCI, whereas having higher educational levels displayed a protective effect against MCI.

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## CONFLICT OF INTEREST

There was no conflict of interest.

## FINANCING

No funding.

## AUTHORSHIP CONTRIBUTION

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