

The Relationship Between Depression and Cognitive Deterioration in Elderly Persons

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ABSTRACT – The objective of this research is to describe the relationship between depressive disorder and cognitive deterioration in residentialized elderly people. This is a descriptive and correlational study with 70 elderly. The variables have been assessed with a Psychosocial Variables Questionnaire, CAMCOG and GDS. Depression was significantly correlated with cognitive level in the non-assisted elderly sample ($r=0.471$, $p=0.004$). Participants' age is negatively associated with the score obtained in the CAMCOG of non-assisted sample ($r=-0.352$, $p=0.038$). Depression is more frequent in institutions that care for older people when they are more dependent.

KEYWORDS: depression, cognitive decline, prevalence, psychosocial factors, cross-sectional study

La Relación Entre Depresión y Deterioro Cognitivo en Personas Mayores Institucionalizadas en Residencias Españolas

RESUMEN – El objetivo del presente trabajo es determinar la relación entre el trastorno depresivo y el deterioro cognitivo en una población mayor institucionalizada. Se ha realizado un estudio descriptivo y correlacional con 70 mayores españoles. Para la medida de las variables se ha usado un Cuestionario de Variables Psicosociales propio, el CAMCOG del CAMDEX y la GDS. La depresión se correlaciona significativamente con el nivel cognitivo en la muestra de mayores no dependientes ($r=-0.471$; $p=0.004$). La edad se asocia elocuentemente y de forma inversa con la puntuación obtenida en el CAMCOG en la muestra de dependientes ($r=-0.352$; $p=-0.038$). La depresión está vinculada a las instituciones que atienden a mayores cuando éstos son más dependientes.

PALABRAS CLAVE: depresión, déficit cognitivo, prevalencia, factores psicosociales, estudio transversal

A Relação Entre Depressão e Comprometimento Cognitivo em Idosos Institucionalizados

RESUMO – O objetivo deste trabalho é determinar a relação entre transtorno depressivo e comprometimento cognitivo na população idosa institucionalizada. Foi realizado um estudo descritivo e correlacional com 70 idosos espanhóis. Para a medição das variáveis, foi utilizado um Questionário de Variáveis Psicosociais, o CAMCOG do CAMDEX e GDS. A depressão se correlaciona significativamente com o nível cognitivo na maioria dos adultos não dependentes ($r=-0,471$; $p=0.004$). A idade está significativamente associada e inversamente para a pontuação obtido no CAMCOG na faixa dependente ($r=-0,352$; $p=-0,038$). A depressão está ligada às instituições que atendem idosos quando são muito dependentes.

PALAVRAS-CHAVES: depressão, déficit cognitivo, prevalência, fatores psicosociais, estudo transversal

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In the last three decades, the relationship between depression and cognition in geriatric patients has been a popular topic among researchers and clinicians (Alexopoulos, 2005; Sanches, 1999; Burhanullah *et al.*, 2020; Dickinson, Potter *et al.*, 2011; Lichtenberg *et al.*, 1995; Wilson *et al.*, 2002). Despite the increase in research, significant questions remain unanswered in the cognition-affect relationship. Clinical and epidemiological research has focused on the identification of risk factors that could be modified in pre-dementia syndromes, at a preclinical and early clinical stage of dementia disorders, with specific attention to the role of depression (Panza *et al.*, 2010).

Research in multiple disciplines has been conducted to determine the relationship between depression and cognition, including neuropsychology, gerontology, psychiatry, and neurobiology. Most studies are cross-sectional (Lichtenberg *et al.*, 1995; McDermott & Ebmeier, 2009; Rabbitt *et al.*, 1994; Sakurai & Okubo, 2020) and are based on samples of patients with dementia, either with or without depressive disorders (Diniz *et al.*, 2013; Johansson *et al.*, 2020). A recent longitudinal study has shown that neuropsychiatric symptoms – including depression – are risk factors or clinical indicators of preclinical dementia syndrome (Burhanullah, *et al.*, 2020) and that depressive symptoms can be predictors of visual memory deficits in middle age (Taivalanti *et al.*, 2020).

Longitudinal studies examining depression over time provided a variety of findings associated with reducing depression treatment (Tarugu *et al.*, 2019), oscillating between no effect and the complete change of cognitive deficits (Lichtenberg *et al.*, 1995).

Some of the drawbacks of studies that have found memory deficits associated with depression are due to the fact that they have been performed in patients with severe depression compared to normal controls, and using tests that require a great effort of memory and that depend on the patient's motivation (Austin *mui.*, 2001).

Longitudinal studies provide data that can be used to determine whether older people who are depressed have a higher risk of cognitive impairment than those who are not depressed. Although longitudinal population studies are scarce (Burhanullah *et al.*, 2020; Modrego & Ferrández, 2004), in Europe, we can find the studies of Zunzunegui *et al.* (1999) and Paterniti *et al.* (2002) and more recently, in North America, the study of Ezzati *et al.* (2019) who have considered depression a predictive factor of cognitive impairment in older persons.

Cross-sectional studies on depressive symptomatology in Spanish older persons (Cerdá *et al.*, 1997; Zunzunegui *et al.*,

1998) consistently estimate a prevalence two or three times higher than in other European populations, despite using different measuring instruments. On the contrary, Spanish studies on the prevalence of moderate-severe cognitive deficits obtain similar prevalence to those of other countries: between 6% and 14% of the population over 65 years old (Baladón *et al.*, 2015; Olivera *et al.*, 2008).

Depression is one of the most frequent problems among Spanish older people (Díaz, 2018), as revealed by the different epidemiological studies on the prevalence of depression in older people, with rates ranging from 5% to 20% in the community population, numbers that can double or triple among the institutionalized older adult population (Camacho-Conde, 2009). Depressive disorders in residential centers for the older persons are a frequent problem, but are underdiagnosed and under-treated, with a consequent decrease in quality of life. Its high recurrence rate, and the lack of proper recognition and treatment, contribute to greater morbidity and mortality, being a frequent cause of suicide (Jassim *et al.*, 2019; Li, 2020; Péquignot *et al.*, 2019; Prakash, 2019).

On the other hand, institutionalization in residences is associated with factors that can favor the appearance of depressive symptoms and can increase the prevalence of this problem. This is combined with the comorbidity of diseases and decreased health in the older persons (Landi *et al.*, 2004) which is also associated with the onset of depression, especially disorders related to the deficiency of some sense (Camacho-Conde, 2009; Cosh *et al.*, 2019; Chou & Chi, 2004; Kim *et al.*, 2011; Singh & Lee, 2019; Wu *et al.*, 2017) or urinary incontinence (Boi *et al.*, 2012). Also, hearing loss increases the risk of neurocognitive impairment (Loughrey *et al.*, 2020). Finally, it should be noted that late-onset depression has a lower hereditary component and is more influenced by social, familiar, and vital environment (Murphy, 1986).

The objective of this paper is to show the relationship between depressive symptomatology and cognitive impairment in a population of institutionalised older persons. The institutionalised older persons have been chosen as the focus of study for three reasons: (i) research has consistently shown that the prevalence of depression in older persons is two or three times higher than older people living in the community; (ii) depression in institutionalised seniors is often not as severe as in psychiatric patients, and similarly, antidepressants are less likely to be used; (iii) the assessment of depression and cognition in the institutionalised population is useful and has clinical applicability for gerontology professionals.

METHOD

Participants

The sample was made up of 70 older persons of Spanish nationality. The non-dependent group was 60% female and 40% male (aged 63 to 99 years old, $M=78.51$, $SD=6.69$) and the dependent group was 54.29% female (aged 67 to 99 years old, $M=82.63$, $SD=6.60$). All participants were recruited from two residential institutions for older persons in the province of Jaen. The length of institutionalization was longer in the older dependents ($M=4.65$ years, $SD=56.53$ months) versus the older non-dependent ($M=4.75$ years, $SD=57.82$ months). The average widowhood times of the non-dependent and dependent groups were 12.69 years ($n=19$) and 8.47 years ($n=17$), respectively.

In order to counteract the strange effects of psychiatric variables and facilitate the administration of tests and the validity of the results, residents with the following pathologies were not included: epileptic disorders, schizophrenia, unspecified psychotic disorders, mental retardation to varying degrees, aphasia, and severe dementia. Older persons with mild hearing loss and mild vision disorders were not excluded, since they do not interfere with the reliability of the tests. Two participants were unable to

complete the entire evaluation because of severe dementia, and their data were excluded from the study.

The sociodemographic variables (gender, age, educational level, socioeconomic level, origin, and marital status) were collected through the center's database, all made under the guidelines dictated by Organic Law 15/1999, of December 13, Protection of Personal Data, and controlled by randomization. The most relevant variables are shown in Table 1.

Measuring Instruments

The scales used to assess depression and cognitive impairment were the Geriatric Depression Scale (GDS) (Yesavage et al., 1982) and the Cambridge Cognitive Test (CAMCOG) subscale of the Cambridge Examination for Mental Disorders in the Elderly (CAMDEX) (Llinás et al., 1991).

Validity and Reliability of the Scales

CAMCOG subscale (Llinás et al., 1991) of CAMDEX Interview is a cognitive battery that objectively evaluates a wide range of superior functions: orientation, language,

Table 1

Affiliation Data of Institutionalized Elders

Indicators	Non-dependents		Dependents	
	N	%	n	%
Voluntariness level upon admission				
Voluntary income	27	77.14	22	62.86
Involuntary income	8	22.86	13	37.14
Marital status prior to admission				
Widower	14	40	22	62.86
Married	12	34.28	3	8.56
Separated/Divorced	3	8.57	9	25.72
Single	6	17.14	1	2.86
Current Marital Status				
Widower	27	77.15	24	68.57
Married	4	11.43	1	2.86
Separated/Divorced	2	5.71	9	25.72
Single	2	5.71	1	2.86
Residence before admission				
Institution	3	8.57	2	5.71
Sons	4	11.42	5	14.28
Spouse	6	17.14	11	31.42
Alone	15	42.85	13	37.14
Other family	6	17.14	4	11.24
Others	1	2.86	-	-

memory, praxis, attention, abstract thinking, perception, and calculation. This scale consists of 60 items (63 in the Spanish version) and includes all of the Mini-Mental State Examination (MMSE) (Folstein et al., 1975), and in the Spanish version, three others have been added to include the Spanish adaptation of the Cognitive Miniexamen (MEC) (Lobo et al., 1979).

GDS is the only self-report instrument built specifically for the assessment of depression in older persons. It is

composed of 30 items, somatic items excluded. This way, a problem present in most self-report instruments – the confusion of depressive symptoms with the common physical symptoms in the older persons – was avoided (Gallagher & Thompson, 1983). If the cut-off point is set to 11, a sensitivity of 0.84 and a specificity of 0.95 is obtained (Izal & Montorio, 1993; Rodríguez, 1998). Applying a cut-off point of 14 gives a sensitivity of 0.80 and a specificity of 1 (Yesavage et al., 1982).

PROCEDURES

The Ethics Committee of the Equality and Social Welfare Council of Andalusian Government (Spain) approved the study. The study was carried out in accordance with the Code of Ethics of the World Medical Association (Declaration of Helsinki) for human experiments. The study was administered in five phases. A first in which a clinical review was carried out through the psychological, medical and social history. In the second phase, the evolutionary stage and the existing diagnoses of cognitive impairment and dementia are evaluated. The third phase was aimed at detecting the onset of depressive symptoms, if it is before admission, before or after deterioration. The fourth phase was devoted to accounting for the number of older persons with depression and/or cognitive impairment, assessed using GDS screening (Yesavage et al., 1982) and CAMCOG subscale of CAMDEX (Llinás et al., 1991). In the fifth phase, a comparative study of the normal and impaired elderly and the associated psychosocial variables was carried out.

The collection of psychological, medical, and social data was carried out through a cross-sectional investigation in the two residences, following the protocol above and measured by the study's psychologist.

Cognitive function was measured by CAMCOG, and depressive symptomatology was assessed by GDS (both Spanish adaptations) (Llinás et al., 1991; Snowden, 1990). The psychological data concerning cognitive and affective evolution were offered by the psychologist of the centers. The sociodemographic data were mostly extracted through the Psychosocial Variables Questionnaire of the author, corroborated and complemented with the social file of social workers. The clinical data were provided by the doctors at each center. In order to avoid the twilight effect after lunch in the gerontological population, the tests were applied in the morning period.

Statistic Analysis

Statistical analysis were done using the statistical program IBM SPSS Statistics V25.0 for Windows, and presented as descriptive and correlational statistics (sample size, percentage, and Pearson's correlation). Besides, p -values < 0.05 were considered statistically significant.

RESULTS

When applying the Pearson test, we observed no interaction between age and the GDS of the non-dependent older persons ($n=35$, $r=0.142$, $p=0.415$), nor with cognitive impairment ($r=-0.234$, $p=0.177$).

We detected no significant relationship between age and GDS score in the sample of dependents ($n=35$, $r=0.133$, $p=0.447$), but there was a significant inverse relationship with CAMCOG score ($r=0.352$; $p=0.038$); CAMCOG score tends to decrease (indicating greater cognitive impairment) with advancing age.

No association was observed between institutionalization time and the score obtained on the cognitive and affective scales (GDS and CAMCOG) in both groups (GDS-non-dependent: $r=-0.209$, $p=0.234$. CAMCOG-non-dependent: $r=0.007$, $p=0.967$); (GDS-dependent: $r=0.251$, $p=0.152$. CAMCOG-dependent: $r=-0.021$, $p=0.907$).

According to the psychological state of the non-dependent elderly at the time of admission, it was observed that –with an average prior evaluation > 2 years– a sample of 18 non-dependent elderly through clinical interview, GDS and MEC or TIMC, presented depression without deterioration 33.33% ($n=6$), depression with deterioration 5.55% ($n=1$), and without depression and without deterioration 61.11% ($n=11$). Among the six who had depressive symptoms without cognitive impairment, it was subsequently found that four of them presented cognitive impairment. Among the 11 that presented neither depression nor cognitive impairment, here we found that 27.27% ($n=3$) presented cognitive impairment and depression together.

Functional capacity was analyzed through activities of basic and instrumental Activities of Daily Living (ADLs). The results obtained in both are shown together (normal

non-dependent versus impaired non-dependent), and specify the sample size and the percentage - Without Help (WH), With Difficulty (WD), Needs Help (NH), and Unable (U) (Tables 2 and 3).

On the other hand, there was no significant relationship between the functional capacity in ABVD and the score obtained in the GDS of the non-dependent ($r=0.159$, $p=0.361$). There is a direct correlation between the functional capacity in basic ADLs and the score obtained in the CAMCOG of the non-dependent group ($r=0.463$, $p=0.005$), which means that the higher the functional capacity score in the basic ADLs, the higher the CAMCOG score. According to the above, the functional capacity in these types of activities results in a better cognitive level, and vice versa.

There were no significant relationships between functional capacity in ABVD in dependents and the scores obtained using GDS ($r=-0.109$, $p=0.532$) and CAMCOG ($r=0.089$, $p=0.611$).

No significant relationship was found between the functional capacity in AIVD and the resulting scores in GDS ($r=-0.312$, $p=0.068$), but a significant relationship was found between the functional capacity in AIVD and the resulting score of the CAMCOG ($r=0.682$, $p=0.000$) in the sample of non-dependents. The latter indicates that the existing direct relationship expresses a better cognitive capacity when greater functional capacity is preserved in these activities, and a better cognitive level facilitates the development of these activities.

Table 2

Basic Activities of the Daily Life of the Non-Dependent Elderly According to Degree of Autonomy

Indicators	Autonomous		Some physical impairment	
	n	%	n	%
Getting up/ Laying down				
Without help	16	100	18	94.7
With difficulty	-	-	-	-
Need help	-	-	1	5.26
Dressing/Undressing				
Without help	16	100	18	94.7
With difficulty	-	-	-	-
Need help	-	-	1	5.26
Cleanliness				
Without help	16	100	18	94.7
With difficulty	-	-	-	-
Need help	-	-	1	5.26
Bath/Shower				
Without help	16	100	15	78.94
With difficulty	-	-	2	10.52
Need help	-	-	2	10.52
WC use				
Without help	16	100	17	89.47
With difficulty	-	-	2	10.52
Need help	-	-	-	-
Up/down stairs				
Without help	14	87.50	13	64.82
With difficulty	2	12.50	5	26.30
Need help	-	-	1	5.26
Walking and strolling				
Without help	14	87.50	12	63.15
With difficulty	2	12.50	6	31.57
Need help	-	-	1	5.26
Eating				
Without help	16	100	17	89.47
With difficulty	-	-	-	-
Need help	-	-	2	10.52

Table 3
Instrumental Activities of the Daily Life Of The Dependent Elderly by Degree of Autonomy

Indicators	Autonomous		Some physical impairment	
	n	%	n	%
To read				
Without help	13	81.25	11	57.80
With difficulty	1	6.25	3	15.78
Need help	2	12.50	5	26.32
To write				
Without help	11	68.75	11	57.80
With difficulty	4	25.00	3	15.78
Need help	2	5.26	5	26.32
To use the phone				
Without help	15	93.75	17	89.47
With difficulty	-	-	-	-
Need help	1	5.26	2	10.53
To shop				
Without help	16	100	9	47.36
With difficulty	-	-	1	5.26
Need help	-	-	9	47.36
To use medication				
Without help	16	100	12	63.16
With difficulty	-	-	1	5.26
Need help	-	-	6	31.58
To use public transports				
Without help	15	93.75	9	47.36
With difficulty	-	5.26	1	5.26
Need help	-	-	9	47.36
To handle money				
Without help	14	87.50	15	78.95
With difficulty	2	12.50	1	5.26
Need help	-	-	3	15.79
To visit the doctor				
Without help	14	87.50	16	84.21
With difficulty	2	12.50	-	-
Need help	-	-	3	15.79
To trim your toenails				
Without help	11	68.75	6	31.58
With difficulty	4	25	2	10.53
Need help	1	6.25	11	57.89

This conjunction is also presented in the sample of dependents: that is, the relationship between the functional capacity in AIVD and CAMCOG score is significant ($r=0.631$, $p=0.000$), but this relationship is not significant when using GDS score (-0.144 , $p=0.409$).

The comorbidity associated with depression in non-dependent older persons was 45.71%, compared to 74.28% in dependent older persons. The most representative pathologies in both groups were: hypertension (HT) in 40%,

diabetes in 22.86%, hip fractures in 20%, depression in 17.14%, Chronic Obstructive Pulmonary Disease (COPD) in 17.14%, stroke in 11.43%, heart disease in 8.57%, Alzheimer's disease in 8.57%, Parkinson's disease in 8.57%, vertiginous syndrome in 8.57%, mild hearing loss in 8.57%, varicose syndrome in 5.71%, and headaches and/or migraines in 5.71%.

In the analysis of the drugs associated with depression, we found that 26.66% of a sub-sample of non-dependents

(n=15) take medication with possible depressive action, and among these, 100% have depression. Among the subsample of dependents, 53.33% are prescribed medication with possible depressive action, and also 100% of these have depression.

In an approach to the study of the evolutionary history of depression and cognitive impairment in non-dependent elderly evaluated jointly - with a temporal mean > two years prior to this study - with GDS-30 and MEC, they had a score in GDS-30 (M = 30 SD = 5.12 n = 12) and in MEC (M = 30 SD = 3.26 n = 10). In the elderly dependents - with an evaluation average > 2 years - they scored in GDS-30 (M = 9.42 SD = 2.82 n = 7). The differential mean is significantly higher in GDS over time, that is, both the non-dependent and the dependent show higher mean scores on this scale as specified below, observing a differential mean in the GDS-non-dependent of > 3.18 points and in the GDS-dependent > 6.29.

The prevalence of depression in non-dependent older persons was 57.14%, compared to 82.85% in dependent older persons. The mean age of those with depression was 79.55 years among non-dependents (n=20) and 82.72 years among dependents (n=7). In the non-dependent older persons, 72.22% (n=13) of the women and 41.18% (n=7) of the men were depressed. In the dependent older persons, 89.47% (n=17) of women and 75% of men were depressed.

The mean scores obtained in CAMCOG were 66.80 (SD=14.25) for the sample of non-dependent older persons, and 34.62 (SD=16.18) for dependent older persons. In the non-dependent older persons, the mean GDS score was 11.60 (SD=6.00), compared to 16.94 (SD=6.05) among dependent older persons. The mean scores in the CAMCOG were 77.66 (SD=4.90) for the sample of non-dependent and non-impaired older persons, and were 55.35 (SD=11.63) in the sample of non-dependent and impaired older persons. The average GDS scores were: non-dependent, non-depressed (M=5.93, SD=2.52); non-dependent, depressed (M=15.85, SD=3.94); dependent,

non-depressed (M=7.16, SD=1.47); and dependent, depressed (M=18.96, SD=4.40).

We found that among non-dependents who scored CAMCOG ≤ 69 , 94.11% (16/17) had depression; with a CAMCOG < 58, 100% (7/7) had depression. In the group of dependents with a CAMCOG ≤ 69 , 82.85% (29/35) had depression; among those scoring CAMCOG < 58, 87.10% (27/31) had depression; among those scoring CAMCOG < 45, 88.46% (23/26) had depression; and among those scoring CAMCOG ≤ 30 (17/17), 100% had depression.

In both groups, we observed an increase in cognitive impairment as GDS score increased. In the non-dependent group, when GDS is ≤ 11 , 78.95% (15/17) had cognitive impairment; when GDS is ≥ 14 , 85.71% (12/14) had cognitive impairment; and with a score < 20, 100% (3/3) had cognitive impairment. In contrast, this difference disappears in the group of dependents, in which, from a score of ≥ 11 , 100% had cognitive impairment.

In the non-dependent residents, the degrees of deterioration in the two groups non-deterioration (ND), minimum, mild, moderate, or severe were: ND, 51.42% (n=18); minimum, 2.86% (n=1); slight, 22.86% (n=8); moderate, 17.14% (n=6); and severe, 5.71% (n=2). Conversely, those dependent residents showed a higher percentage of deterioration in the higher-grade criteria: no residents with ND and minimal deterioration, 11.43% (n=4) with slight, 22.86% (n=8) with moderate, and 65% with severe (n=23).

When comparing the GDS and CAMCOG scores of non-dependent older persons, we detected a significant relationship (Pearson's correlation test, $r=-0.471$, $p=0.004$). We detected no such CAMCOG-GDS relationship for the dependent older persons (Pearson's correlation test, $r=0.156$, $p=0.372$). The student's *t*-test was applied in the two independent samples, obtaining a bilateral significance of 0.005, so that the null hypothesis is rejected. This indicates that there is a likely relationship between depression, cognitive impairment, and the development of dementia.

DISCUSSION

Our results indicate that depressive symptomatology correlates with cognitive impairment, and through a retrospective analysis, in a subsample, we detected considerably impaired development in one in every three older persons. This finding is consistent with longitudinal studies of large samples that predict the incidence of dementia (Ezzati et al., 2019; Tan et al., 2019). Our findings are in line with other studies (Garay, 2007; Plati et al., 2006). Recent studies have shown that over time depression predicts cognitive impairment (Chan et al., 2019; Dean, Oulhaj, Zamboni, Dejager, & Wilcock, 2014) and Alzheimer's disease (Javaherian et al., 2019; Ruthirakuhan et al., 2019).

Our findings indicate high rates of depressive symptoms in institutionalized elderly people. The prevalence of depressive disorder evidenced in the present work is high and similar to that noted in other studies (Beekman et al., 2000; Izal & Montorio, 1993; Schoevers et al., 2003; Snowden, 1990) and depressive disorder was more common in the dependent group of elderly. These findings are consistent with other studies that have reported an incidence of depression four times higher among institutionalized older people than non-institutionalized older people (Valvanne et al., 1996).

There are significant differences in the basic and instrumental ADLs between non-depressed and depressed

non-dependents, and between non-depressed and depressed dependents. Both depressive symptomatology and cognitive impairment are related to a greater deficit in executive functions (Plati et al., 2006). The basic and instrumental functional capacity is significantly related to the cognitive level of the non-dependent group, and the advanced functional disability situation in the dependent group correlates with the cognitive level of impairment, since the degree of limitation and dependence of the dependents is higher (Ames, 1991; Harrison et al., 1990).

Depression is a frequent symptom in neurodegenerative diseases (Alzheimer's, Parkinson's, dementia with Lewy bodies, frontotemporal and cerebrovascular dementia), both from the initial and more advanced stages of the disease, which may accompany cognitive symptoms (Camacho-Conde, 2009, 2019; Diniz et al., 2013; Johansson et al., 2020; Ray & Agarwal, 2020).

The progressive aging of the population, and the increased risk of depression in recent generations, mean that in the future the frequency of depression in older persons will be even greater, and will become a public and/or mental health problem of great relevance. Given this health problem, the availability of early detection instruments is necessary (Plati et al., 2006) as well as to initiate an early therapeutic intervention

in residential institutions by gerontology professionals (Plati et al., 2006) in the same way that it has been carried out from the centers of social or health care (Won & Kim, 2019).

Also, due to the gradual ageing of the population and the increase in the institutionalization of the elderly, further research should be carried out to assess how it affects traditional models compared to other more innovative models (Leung et al., 2020). The relationships between depressive symptoms and institutionalisation should be further investigated, since in our study it was not possible to determine whether institutionalisation alone favours depression, or if there is a greater number of depressed older people institutionalised by their families. The same relationship can be considered when thinking about cognitive impairment and institutionalisation (Plati et al., 2006).

Finally, it is important to consider that depressive symptoms might be an early manifestation rather than a risk factor for dementia and Alzheimer's disease, arguing that the underlying neuropathological condition that causes cognitive impairment or dementia also causes depressive symptoms. In this scenario, at least in certain subsets of older patients, end-of-life depression, Mild Cognitive Impairment (MCI), and dementia could represent a possible clinical continuum (Panza et al., 2010).

CONCLUSION

In our study, the presence of a high prevalence of depression coincides with other studies conducted in the institutionalized gerontological population (Almomani & Bani-Issa, 2017; Selbæk et al., 2013). Depressive symptomatology has not been able to be associated with functional capacity in either group, but it has been proven in longitudinal studies. However, it remains unclear whether there is a significant relationship between basic and instrumental functional capacity at the cognitive level of the non-dependent group with the cognitive level of impairment (Banaszak-Holl et al., 2011; Bürge et al., 2013; Jerez-Roig et al., 2017). Non-dependent elderly patients

who are admitted to institutions with depression seem to have a greater tendency to develop cognitive impairment and dementia than those who enter without depressive symptoms (Zunzunegui, et al., 1999).

The generalizability of the study is limited by the small number of elderly in the sample. We do not attempt to make exhaustive conclusions, and this work should stimulate future more extensive and longitudinal cross-sectional research with a national scope. The findings are extrapolated to older persons who are able to complete cognitive tests and answer the GDS questions.

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